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Annual Review Number

Business and Construction

Engineering Science and Practice

Status of Major Projects

Power and Transit Trends

Water Resources Studies

An Editorial Survey of the Year

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Including Reviews and Special Articles by:

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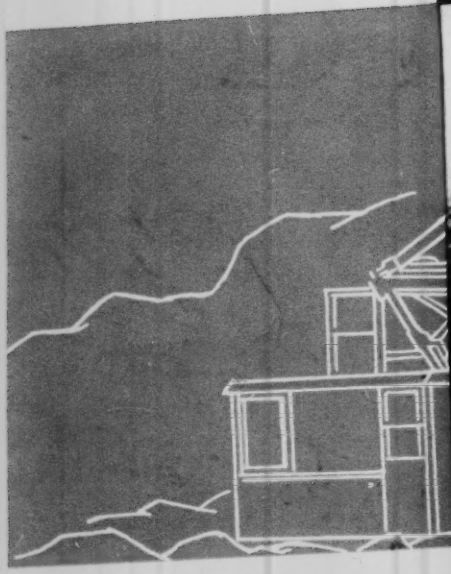
FIRST —AND WHY!



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To Make Learning More Useful—II

(Continued from last week's issue)

LAST week this page considered the increasing need for men competent to unify the specialized progress of many fields and to help formulate sound social and economic policies. But where shall we find such men?

Obviously not amongst the money-minded, to whom productive science and industry are but pawns in a fascinating game of acquisition. Probably not amongst the practical business men whose dominating purpose is, of necessity, to wangle a profit for their own enterprises out of current operations. Certainly not in the regiments of highly trained specialists each of whom is very likely to be an illiterate in other fields of learning. And most certainly not amongst the hordes of those who boast a "broad academic training," that Mother Hubbard schooling which covers everything and touches nothing. Even now great mischief must be charged to those busy scribblers of academic standing whose practical understanding and accomplishment is nil but who possess the gift of making ignorance sound interesting. Despite the smug pretension of this group to being the leaven in a lump of specialists it becomes more and more evident that their vague aspirations and criticisms are no practical help to those who must carry on the work of the world.

It is evident, in short, that we shall be in a bad way if we must choose for guidance between the specialists who know more and more about less and less until eventually they know everything about nothing and those of "broad academic education" who know less and less about more and more until eventually they know nothing about everything.

WE NEED, therefore, the type of effort contemplated in these professorships; we need to seek the common denominators of human knowledge in many fields, to relate the achievements of the specialists to the current limitations of general understanding and the requirements of current thought, to hold up to men in every field, a mirror backed by a comprehensive grasp of human needs and aspirations and resources, so that each may see more clearly the significance of his own contribution. We need to reconcile long term values with current necessities and to make available for those who must deal practically with either of these the instruments that are made possible by advancing science in every field. These are but a few of the steps that must be taken if we are to succeed in our splendid effort to reconcile the three articles of our social and economic creed, i.e., consistent advance in the physical sciences, an economic system of free enterprise and vast integration of effort and a democracy of universal suffrage. Beneath all its superficial and specialized aspects that absorb so much of our attention, this, in fact, is the heart of the problem that confronts us.

SOME may dismiss the announced objective of the new professorship as "just an ideal." An ideal it surely is. But only as we achieve some measure of that ideal shall we be educated to cope with the world in which we live and to deal with the forces that have created that world. Once, when the circle of knowledge was more compact and its instruments less complex, some men were educated in that sense of the word. But today we are prone to mistake narrow vocational training for education and specialized aptitude for cultural accomplishment. And for the more hardly attainable education and culture that we so grievously lack we substitute a superficial urbanity that charms and captivates while it glides gracefully over the inherent problems of our times. All this may provide a meal-ticket for the so-called intellectuals and may pander to the prejudices of their devotees but it doesn't help the people who must do the day's work, either as individuals or in mass, to see clearly, to appraise wisely or to think soundly. And these are vital requirements if the coming generation of Americans is to navigate successfully the course now indicated by the march of events.

While the move for more effective coordination of learning may have been launched too late to anticipate the need, we may take courage from the eventual recognition of that need and the move to meet it: never is it too late to try the right thing even though full accomplishment may be hampered by delay.

Willard Chevalier

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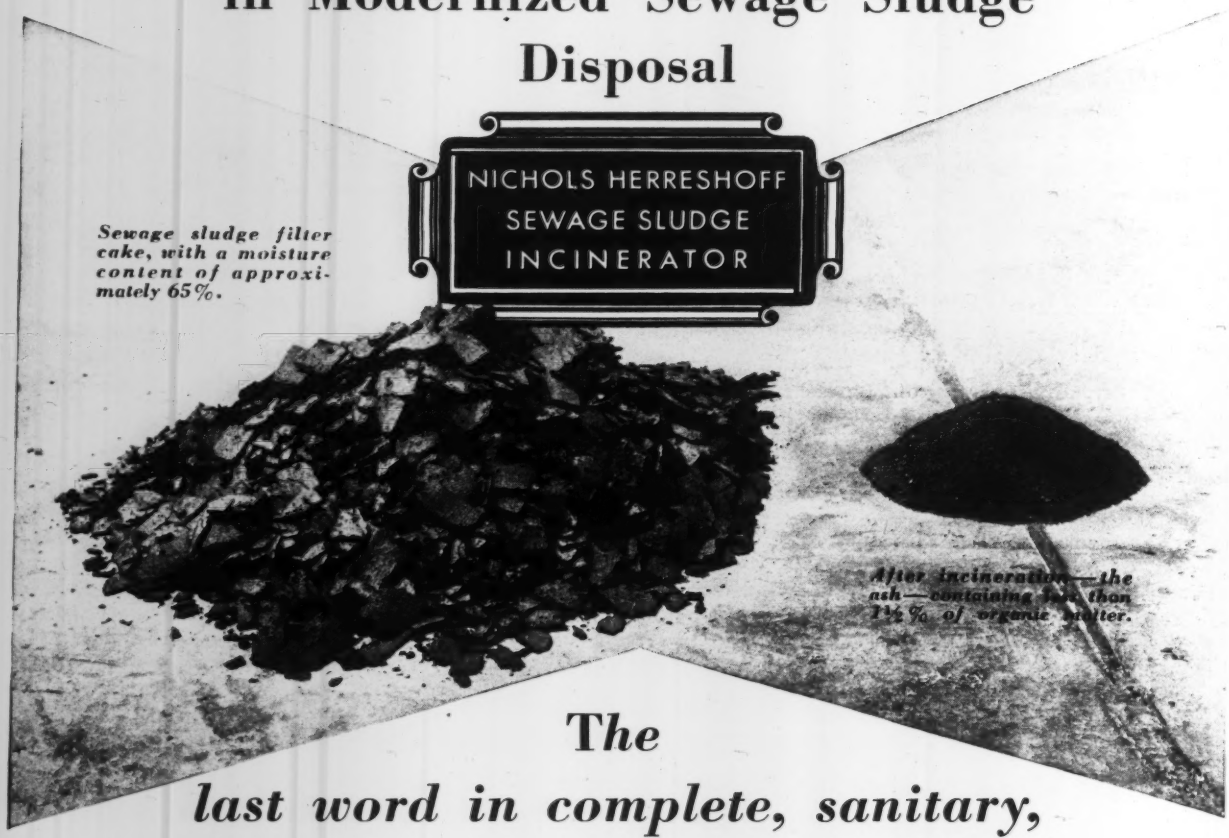
A Notable Engineering Achievement in Modernized Sewage Sludge Disposal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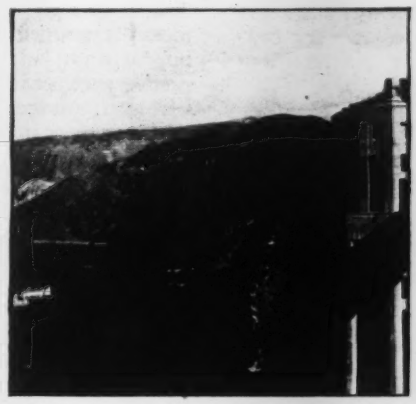


An Editorial Survey

Back to Work

FOR ENGINEERS as well as other men the rise of a new spirit of enterprise was the decisive characteristic of the year just closed. The impulse of this spirit carried forward the slow and uncertain recovery of the preceding twelve months in consistent advance. Construction entered a new period. Following on the beginnings, marked resumption of house-building and industrial construction set in early in the year. This new activity brought increasing encouragement; even such an epochal event as the sudden ending of the industry code system, which in the first part of the year dominated industrial thought and action, served only to strengthen confidence. Nor did enactment of the four-billion-dollar relief works act check the forward movement. The new initiative and confidence plainly signify that the country is going back to work.

NEW PATHS are likely to be followed by the resumed advance. Hence reorientation at the opening of a new season warrants unusually careful appraisal of conditions and trends. The present issue of *Engineering News-Record* has been planned to assist in this appraisal. It will be seen to set forth a favorable prospect, forecasting steady growth during the year, with no major interruptions. The record shows also that the art has made progress and is adequate for all demands.

CONSTRUCTION RECOVERY paralleled the revival of general business during the year, though with a natural lag. Capital-goods production remained well behind that of consumption goods, and construction in turn lagged behind capital-goods manufacture. Corresponding to a rise in the capital-goods field in 1934, industry construction accelerated sharply in the early spring of 1935; house-building had begun to spurt some months earlier. Maintaining these advances through the year, construction made a considerable gain over 1934 and reached 3.7 billions. This is 30 per cent above the low of the depression and nearly half of normal. For comparison: Factory production advanced to 74 per cent above its low point, national income 33 per cent, business activity 50 per cent, reaching nearly three-fourths of normal. The lag in construction activity shown by the figures suggests a more rapid rise in the next few years.

For the immediate future the outlook depends on how actively the states and cities resume their improvement work after federal financing ceases. This important branch of construction, which in normal years makes up nearly a third of the country's total, may shrink for a time because of economy demands and acquired habits of dependence on federal aid. But the gains in private enterprise—house, industrial and utility building—should overbalance any such reduction.

THE YEAR'S RECORD shows favorable natural conditions. The drought of the preceding period was definitely broken; streamflow returned to normal and depleted groundwater storages were largely replenished. Crops were good. Man-made conditions in the form of legislative and court action, on the other hand, were far from normal.

Initiation of a vast relief-works program designed to substitute jobs for doles came about early in the year. Much legislation of radically new kind followed, covering labor relations control throughout the United States, social security (old age and unemployment benefits, to be provided in cooperation with the states), coal price control, national utility regulation, motor carrier regulation, and other purposes less directly related to engineering interests. Among court decisions the voiding in May of the industry code section of the National Industrial Recovery Act of 1933 was outstanding, though various other decisions on recent legislation were of far-reaching economic moment.

None of these events had any apparent effect on economic or construction progress except the administration of the relief works act. The delays, restrictions, and administrative mishandling that characterized the execution of this measure retarded the recovery of construction, made useless a vast amount of project planning, and seriously interfered with the work of engineers and contractors the country over. That recovery continued from month to month in spite of this retarding effect is impressive evidence of its momentum.

IN THE CONSTRUCTION BALANCE SHEET the past year added to the previous large deficit in the country's physical plant, a deficit that must in due course be made up. Total construction accomplished was barely half of what is needed to keep the plant up to current needs. The housing deficit increased by half a million units, industrial and utility plant also fell farther behind, and public-service facilities only less so.

* * *

Recovery, Relief and Public Works

PUBLIC-WORKS RECOVERY OPERATIONS were discarded in favor of relief procedures in the course of 1935—due to method of administration rather than intent and terms of the Emergency Relief Appropriation Act. Thus the broad movement to stimulate reemployment and industrial recovery through a large national program of public works that had been under way for more than three years and found partial recognition in the 1933 public works act reached its end, and regimented charity methods were adopted instead.

As the Supreme Court's decision on the NIRA left intact the public-works section of this act, the PWA organization remained available as a trained recovery agency. With the purpose of utilizing the PWA's work-initiating power, Congress in writing the four-billion-dollar relief works act designated a large part of the total for carrying out construction works, including grade separations, municipal works, roads and flood protection, by normal contract methods that would extend their effect throughout industry. Municipal project applications came in to PWA to the amount of billions of dollars, and much of this work was ready for a quick start, as was also a large amount of grade separation work. The President chose not to utilize these recovery and employment means.

Under the plenary powers granted him by the act he decided that most of the appropriation should be devoted to primitive types of work conducted by desultory relief-squad methods giving part-time occupation to persons on relief rolls, regardless of recovery requirements. The regulations and practices were aimed not to produce a maximum amount of total employment but a maximum of direct or at-the-site work. Normal construction work was made virtually impossible by the famous $800 to $1,400 cost limit per man-year, which resulted in transforming the great works program into an ineffective economic and social activity. Thus the public-works principle finally disappeared from the scene. For details of the operations of the WPA (Works Progress Administration), through which the relief service was carried out, our week-by-week news reports during the year may be consulted.

LARGE NATIONAL PROJECTS were made as prominent a feature of the 1935 as of the 1933 program, some of which lacked Congressional authorization, as the Passamaquoddy tide power project and the trans-Florida ship canal. A characteristic of these undertakings is that they do not form part of any consistent national improvement plan or development policy. Many of them were schemes whose economic value either had not been impartially appraised or had been found negative; some lacked full technical study and plans. Much of the money expended on these national projects therefore is unproductive and must be written down as relief and recovery expense rather than as useful permanent investment. Altogether the year brought retrogression rather than progress in the evolution of national improvement policies.

* * *

Railway and Highway

IN THE TRANSPORTATION FIELD the situation during 1935 was dominated by continued growth of highway traffic, gradual improvement of the bad financial position of railways, continuation of efforts by the railways to regain traffic—particularly in the passenger field through increase in the number of fast, lightweight trains of modernized type—and finally by passage of the Motor Carrier Act. As a net result some progress was made toward ultimate coordination of the two essential transportation agencies. Under the circumstances railway construction could show but little activity, while highway development went on at normal pace, with certain interesting modifications introduced under the emergency relief works program.

THE MOTOR CARRIER ACT was in many respects the chief event of the year in the transportation field. From the safety viewpoint it is as significant to the highway engineer as to the public because it places all common carriers and contract carriers by road directly under the control of the Interstate Commerce Commission and this authority may be extended to include private carrier safety if the commission find this necessary. The commission's long experience in railway safety supervision assures effective steps to increase the safety of truck and bus operation, including elimination of the overworked truck driver as a road hazard. Unfortunately the act does not empower the commission to regulate sizes and loads but merely calls for a report on this subject—known to be the weakest spot in highway administration.

From the standpoint of efficiently adjusted transportation the new act is even more important; it should help to give the motor vehicle its proper place and remove disorganizing and misdirected competition. So long as motor transport remained uncontrolled as to rates of pay, hours of service, continuity of operation and safety measures, in all of which the railroads are strictly controlled, the highway carriers took away business from the railroads that they could not have taken if equally regulated. This hurt not only the railroads but ultimately the motor carriers themselves and all transportation service. The new act will go a long way toward correcting the situation by putting the two agencies on an equitable competitive basis.

RAILWAY PROSPECTS improved during the year, through a moderate to marked increase of traffic, but new railroad construction continued at a very low level. Early in the year it was expected that a large amount of money would be spent on the separation of rail and highway grades, the railroads having planned a considerable amount of such work and $200,000,000

having been allotted for that purpose under the Emergency Relief Act. But the regulations set up for expenditures under that act placed the ratio of direct labor to material costs on any job so high as to exclude much grade-crossing work, and as a result almost none was undertaken until the regulations could be modified. At the end of the year, about 600 relief-act projects amounting to a little over $50,000,000 had been approved and 300 had been placed under contract.

Outside of grade-crossing work there has been some new line construction resulting from the relocation of railway lines that pass through reservoirs to be formed by some of the power and flood control dams now under construction. There also has been some terminal and track elevation work. On the Pacific Coast extensive track elevation work was carried on by the Southern Pacific at San Jose and actual construction of the long-projected union station at Los Angeles was begun. In the East, the Pennsylvania has continued its terminal reconstruction work at Philadelphia, Newark and Baltimore, which was undertaken in connection with the electrification from New York to Washington that is now completed. The New York Central carried forward its line revision and track elevation work at Syracuse, N. Y., and the reconstruction of its West Side lines in New York City.

MAINTAINED HIGHWAY CONSTRUCTION was an essential factor in keeping up construction employment, as in the two years preceding. Technically, the methods and practices developed by experience and research were not changed, except for normal progress, but an increased share of work on secondary and farm-to-market roads turned greater attention to medium and low types of construction. Administratively there were certain important changes because of the requirements of the relief act, from which a large part of the work was financed.

Federal money continued to be a major resource, and this was provided under regulations governing distribution and manner of use that quite altered normal practices and responsibilities in roadbuilding. Financing proceeded partly with the PWA $400,000,000 road fund of 1933, partly with the emergency fund and regular federal-aid fund authorized by the Hayden-Cartwright act of 1934 and partly with the $400,000,000 allotted from the relief works act of 1935, supplemented by grant and loan money from PWA funds and by CWA and WPA allotments. At present relative figures of sources of money and mileages constructed cannot be stated accurately; in general each of the last two years' construction has added some 30,000 miles of improved roads. The chief characteristic of the new work is the increased volume of secondary roadbuilding and the continuation of roads through cities, formerly no part of the federal or state roadbuilding functions.

ROADBUILDING TECHNIQUE witnessed no essential changes, but the quality of materials and the precision of fabrication improved. Bituminous mixtures, brick, concrete and stabilized soils continue as leading road types and the elements of each type remain the same, though materials and fabrication have become better. Arterial roads, considered as intrastate or interstate through routes as distinguished from the mere connecting up of main neighborhood roads, made no progress. There were, however, striking examples of city belt road planning and the building of superhighway entrances into cities and through metropolitan districts. Safety and traffic received more public attention than any other single phase of the highway problem, but none was less productive of conclusive thinking or action.

TECHNICAL RESEARCH continued to be a source of inspiration and encouragement. The advance is not confined to specific accessions of knowledge but includes increased acceptance of experimentation as an essential of rational design. A notable extension has occurred in the application of soil mechanics to subgrade design; geophysical methods of determining deep subsurface conditions have been developed to practical field use; soil stabilization has been simplified for regular service; striking advance has been made in lamps for road lighting and in the knowledge of vision by artificial light; consolidation of concrete by vibration has been developed, and materials and their combination and interreaction in road structure have been more clearly worked out.

* * *

Structural Developments

STRUCTURAL PROGRESS as exhibited in the design and construction of bridges and buildings and in the associated design methods, research and materials developments continued in encouraging and satisfactory manner during 1935. Professors Cross and Withey make this evident in their articles on pp. 199 and 203. In conjunction with their analysis, the following factual summary rounds out the bridge and building record of 1935.

BRIDGES BROUGHT FORWARD no new project to threaten the supremacy of the two San Francisco bridges as the most notable of current undertakings. The year witnessed the introduction on the Bay Bridge of two-grooved spinning wheels and on the Golden Gate Bridge of a double wheel, to place four wires in a cable at a time instead of two as formerly. On the former structure erection of assembled sections of stiffening trusses and floorbeams marked a new departure for large suspension bridges; advance of erection method was also evidenced on the 1,400-ft. cantilever span of this project, by the use of guy derricks and the absence of falsework.

New records for length of span were set during the year for a number of bridge types as follows: 800 ft. for a hingeless steel arch, under construction over the Harlem Ship Canal in New York; 627 ft. for a concrete arch, under construction across the Elsa River in Spain; 170 ft. for a concrete truss, completed in Pierce County, Wash.; and 544 ft. for a vertical lift span, completed over the Cape Cod Canal.

MAJOR BRIDGES COMPLETED include the Mississippi River bridge at New Orleans, containing a 790-ft. cantilever in its 4-mile length; the Missouri River bridge at South Omaha, Neb., containing a two-span 1,050-ft. continuous truss; the Mississippi River bridge at Davenport, Iowa, which includes a 740-ft. suspension span; and the Rip Van Winkle bridge over the Hudson River at Catskill, N. Y., whose major element is an 800-ft. cantilever span. The 1,380-ft. span suspension bridge of the Triborough bridge project in New York, completed except for paving, sets a new width record of 98 ft., for two-cable bridges.

Light-weight floors, encompassing such types as the concrete-filled steel grid, the open steel mesh, the steel channel filled with asphalt plank, the battledeck steel plate, and the concrete slab with light aggregate, have been installed on an increasing number of bridges. The year witnessed the completion of only one large

all-welded bridge, a 160-ft. swing span over the Rancocas River in New Jersey.

Basic steel stresses again moved upward. The A.R.E.A. raised its unit stress to 18,000 lb. per sq.in., only to have the American Institute of Steel Construction, which initiated the 18,000-lb. value several years ago, announce plans for another raise to 20,000 lb. in line with the higher yield point of the recently adopted 60,000-72,000-lb. grade of structural steel.

IN THE CONCRETE FIELD the revised A.C.I. concrete building code was completed and will soon be offered for adoption. Research was carried on to investigate the advantages of high-elastic-limit steel for concrete reinforcing. In timber, the year saw the abandonment of the grademarking plan for designating structural timber and the substitution of specific stress values for the various types available.

BUILDING saw a rapid and sustained rise in industrial building contracts. Advance of practice is reflected in the generally modern and substantial form of structure provided for. Building code revision occupied committees in New York, Boston and Chicago. The American Standards Association took over the standard building code work formerly handled by the Bureau of Standards.

New York City boasts the only new skyscrapers of the year—the International Building of the Rockefeller Center group and the federal courthouse, both of 38 stories. Most notable of large structures is the Kansas City municipal auditorium, whose roof framing includes two 226-ft. steel trusses, weighing 240 tons each, and whose arena floor is framed with two lines of continuous concrete girders 2½ ft. wide and 6 ft. deep supporting concrete cross joists of 86-ft. span varying in depth from 4 to 6 ft. between the center and the supports.

Earthquake studies and design progress continued active. Of greatest moment was the work of the U. S. Coast and Geodetic Survey in examining the vibration characteristics of structures, using its strong-motion instruments. The earthquake of the year, a long series of which the main after-shock on Oct. 31 was the most destructive, occurred in Helena, Mont. Since this city had not experienced an earthquake previously, its buildings had not been designed against shock, and much destruction occurred. A large high-school building just completed, a PWA project, was completely wrecked.

HOUSING CONSTRUCTION was one of the notable features of the year. The striking feature was the initial revival of private house-building, and this was of decided strength. After a complete collapse of activity, that began in 1928 and led to abnormally low levels in 1932-34, it rebounded strongly in 1935, going to double the number of family units built in 1934. Prospects are for even greater increase in the two years ahead.

The Federal Housing Administration's system of mortgage insurance, joined to banking-act amendments that permit banks to do an extensive mortgage business safely, has brought out much building money, mainly for speculative-builder operations. While the large mortgage-lending institutions and the building loan groups have not yet taken an active part in modernized building, the FHA plan for insured amortized mortgages at moderate interest rates won full recognition as the model to be followed in all future mortgage financing.

Research, planned to provide a modern substantial house for $5,000 or less, was sponsored by a number of manufacturers of equipment and materials as well as by several philanthropic organizations. The prefabricated house reappeared in a number of varieties; the new element in the present trend is the emphasis on equipment—the house as a machine, with structure secondary to installation. The most ambitious and scientific of the housing researches is being carried on at Purdue University, where laboratory tests of materials and accessories are being followed by construction of houses to determine costs.

The large-scale low-rent program of the PWA reached the field in 1935. All seven of the publicly-financed private (limited-dividend) projects were completed and occupied; further sentiment in favor of this type of housing is temporarily at a low ebb. Of the 50 federal-owned projects in 35 cities, 47 were advanced to some stage of construction activity, but only one project reached virtual completion, this being Techwood, in Atlanta. At the year end a bill was being prepared for Congress that would provide a permanent set-up for slum-clearance housing, with local authorities handling the work aided by a federal subsidy. The first municipally built housing project in the United States was opened by New York City; it was built with federal help through relief labor provided by WPA.

In the private field the Federal Housing Administration insured several loans made by banks to limited dividend companies for large-scale housing. Subsistence homesteads work was transferred with other activities to a new organization, the Resettlement Administration, which toward the end of 1935 announced plans for four large suburban housing communities, to cost $27,000,000. Both PWA, by the type of fireproof multiple dwelling that it is building, and FHA, through its control of design and construction of private building work, have exerted a beneficial influence for better construction.

FOUNDATION DEVELOPMENTS were headed by completion of the south pier of the Golden Gate Bridge in spite of deep water and powerful tidal currents, using a permanent concrete fender system as a cofferdam. An unusual earth slip moved a pier of the Grand Coulee cantilever bridge dangerously. Exploratory studies of foundation materials by electric-resistivity and sound-wave methods were carried out by the Bureau of Public Roads and others. Wellpoints as adjuncts to foundation excavation were more widely used. In New York City a radically new foundation process was applied to the new federal building; steel caisson cylinders were sunk by boring them into the ground. At Fort Peck, auger excavation was used to bore 60-in. holes in shale for concrete foundation piers for the spillway structure.

SOIL MECHANICS advanced to an important degree in its practical application. Thoroughly equipped soils laboratories were provided on such operations as Muskingum Valley, Fort Peck and Mississippi flood control, and laboratory guidance of either design or field work established itself as standard practice in such undertakings. Wide attention was also given to scientific soil study in technical schools and in construction work where such developments as control of moisture and compaction for maximum density according to Proctor's observations found application. As a result the efficiency and certainty of engineering work in earth made definite progress during the year.

AMONG MATERIALS used in construction work, cement and concrete continued to register the most activity. On the other hand, both steel and timber attracted more attention than in the previous years. In structural steel, the well-known silicon, manganese and nickel alloys

are being supplemented by steels containing copper, molybdenum and chromium. Some 1,500 tons of a chrome-manganese-copper steel were used for a 1,080-ft. steel arch bridge in Rhodesia. In this country the most notable development is the use of copper-bearing steel for all structural work of the San Francisco-Oakland Bridge. The cantilever bridge of this project incorporates some 7,000 tons of copper-bearing nickel steel.

* * *

Water and Power

CURRENT PROBLEMS and construction projects revolve so largely around streams and other waters that an important group of the year's activities is best summarized under the heading of water and power. Aside from specific projects and operations, there was a remarkable growth of recognition of the national significance of water resources and the technical investigations auxiliary to them. This development, which may fairly be ranked as one of the major events of 1935 in the civil engineer's field, is the theme of a special article on a later page.

Acting under the stimulus of the National Resources Committee, many states that had not set up corresponding commissions established such bodies in 1935; there now are 36 states with bodies which, whether bearing the title "Planning" or not, are concerned with the study of natural resources as their major assignment. Many of these state bodies have carried on exhaustive compilations, but work of practical value in most instances must wait on fuller data.

FLOODS emphasized the inadequacy of our knowledge of rainfall and runoff. Record-breaking rainfall caused extensive flood damage during 1935 in New York, Texas, northeastern Colorado and Nebraska, and Ohio. In a number of these storms rainfall intensities and durations were recorded that far exceeded earlier records.

Little new flood-protection work was initiated during the year, but steady progress was made on a number of flood-control undertakings. The program of work laid down for the lower Mississippi River under the modified Jadwin plan is virtually complete, and work now is concentrated on a river-straightening plan that has every indication of being successful. Along the Rio Grande, where the Mexican and American governments are cooperating in river straightening and in the construction of levees and flood channels, good progress was made.

Operations looking toward the detention of flood waters in storage reservoirs include the Muskingum Valley work in Ohio, the Winooski River improvement in Vermont, and Tygart reservoir on the headwaters of the Ohio above Pittsburgh. Work also has begun on a reservoir at the headwaters of the New River in West Virginia. In Florida, the levee protection work around Lake Okeechobee is nearing completion. The record would not be complete without reference to the fact that completion of Boulder Dam ended forever the threat of disastrous floods in the Imperial Valley in California.

UNDERGROUND WATER gained distinctly in importance. East and West as well as the Great Plains are actively interested in groundwater, and present trends indicate increasing emphasis upon this phase of water supply. The development of underground sources of supply by the city of Tacoma, Wash., where copious rainfall on forested mountain slopes near by affords ideal conditions for surface catchment and surface storage; the decision of state authorities to preclude New York City from exploiting the limited Long Island groundwater supply; the concern over groundwater levels in the northern Great Plains region; and the challenge to the Florida Canal raised by the communities of the state on the score of danger to their underground supply, are current instances of the growth of attention to the subject. Utah gave practical recognition to groundwater values by passing a law that made all water subject to public control.

WATERWAYS received large funds under the federal public-works program begun in 1933 and continued in 1935 under the Relief Act. At the end of 1935 work was in progress on all but two of the dams required to create a modern barge channel for practically the entire length of the Tennessee River, and since the first of the year work has been begun on one of those dams. The upper Mississippi River work, calling for 27 locks and dams, made good progress and is over one-third completed. The channel control work on the Missouri between Kansas City and Sioux City, Iowa, 380 miles, was continued during the year and has resulted in marked improvement. A mark in waterway history was the federal government's decision to take over the deepening and improvement of the New York State barge canal.

COAST EROSION attracted more serious public attention than in the past because of destructive storms along the North Atlantic seaboard last year. Efforts were made to get the federal government to finance coast protection work. Coast protection work was included in the program of the Emergency Relief Act, but nothing was done.

STREAM POLLUTION as a problem of national importance was recognized in a report of the special advisory committee on water pollution of the National Resources Board, which recommended establishment of an experimental conservancy district on the Potomac River wherein all the problems associated with stream pollution could be studied. The Interstate Sanitation Commission, through which New Jersey, New York and Connecticut would cooperate in ending pollution of New York harbor and tributary waters, was approved by Congress.

IRRIGATION through the work of the U. S. Bureau of Reclamation also received strong impetus as a result of the Emergency Relief Act, the amount allocated to the bureau in the year 1935 equalling that spent by it in a full decade of its previous history. In addition to completing the work at Boulder Dam, the large items on the bureau's program include funds for the start of work on the Central Valley project in California, the All-American Canal and the Casper-Alcova irrigation project, as well as continuation of work on Grand Coulee Dam; more important than these are various projects to provide supplementary water to existing irrigated areas.

An important change was made in the Grand Coulee project. In June the plan for building a low power dam, to be enlarged and raised later for irrigation service, was abandoned, and the funds allotted to the project are being spent to build the lower part of the projected 475-ft. dam, without provision to generate power.

The controversy between Arizona and the other states of the Colorado Basin was reopened late in the year by a request from Arizona that the Supreme Court make a judicial determination of the equitable distribution of the water, despite the specific terms of distribution laid down in the Boulder Canyon Act. Earlier in the year, as an outgrowth of the attempt of Arizona to prevent construction of Parker Dam, the Supreme Court ruled that

the dam had not been authorized by Congress and work was stopped. Subsequently Congress authorized construction and work was resumed.

POWER CONSUMPTION rose to unprecedented peaks during the year, clearly indicating that a pronounced revival of electric utility construction is ahead. The federal government's waterpower construction program was curtailed during the year by elimination of the power plant as part of the initial construction program at Grand Coulee, as previously noted. No power is included in the new dams begun by the Tennessee Valley Authority. Beyond these superficial indications, however, there is no evidence that the government has developed a logical power program. Its Power Policy Committee has marked time while such questions as what is to be done with the power generated at Bonneville Dam go unanswered.

* * *

Public-Service Engineering

PUBLIC-SERVICE ENGINEERING and construction during the year were dominated by city finances and their relation to the national government's emergency activities. The controlling conditions were shaped by the failure of the private financing machinery in 1931 to '32, then by an alarming accumulation of tax collection delinquencies and the unmarketability of bonds of local governments, followed by the Reconstruction Finance Corporation and the Public Works Administration, which were set up as rescue agencies. The net result has been an extensive temporary modification of normal procedure in planning and undertaking local improvements. The immediate future depends on whether federal financing of local governments will be continued, and how rapidly the local authorities reassume their normal planning initiative and succeed in obtaining the necessary funds in the face of economy demands by taxpayers, especially realty interests. Increase in house-building, now on a sharp upturn, may accelerate the change by requiring new service facilities to serve new residential areas and redistributed populations.

REMARKABLE BETTERMENT OF FINANCIAL POSITION occurred in the municipal field, having begun late in 1933 but becoming decisive in 1935. This financial rehabilitation is made evident by the eagerness with which city bond issues carrying unusually low interest rates have been absorbed. Borrowings by cities, a little under those of 1934, amounted to less than a billion dollars. Statutory tax limits set by new state legislation in many states, together with reduced assessment values, curtailed city finances so severely as to bring other taxes, such as sales and head taxes, into currency. Tax collections, which had declined from 1930 to 1932, and first improved in 1934, continued up. The situation of cities and states is now in course of steady improvement; the undiminished relief load, however, and the withdrawal of the federal government from direct relief activities may keep the outgo side of the ledger abnormally large.

PROSPECTS FOR LOCAL CONSTRUCTION accordingly remain doubtful for some time ahead, as above suggested. The low tax limits prescribed in many states by recent restrictive laws passed under pressure of the realty interests and the limitations on bond issue borrowing are already leading to a reaction, however, because of their unworkable severity, and it is possible that many of these limits will be removed before long, thereby permitting normal improvement planning to be resumed.

City and regional planning benefited substantially after the impetus given to state planning through the efforts of the National Resources Board to correlate local planning with national objectives. One of the noteworthy trends in the revitalized city planning is toward development of a more elastic plan, in which basic concepts rather than precise details are set down, leaving the working out of physical details to be controlled by actual needs of growth and modernization.

PUBLIC-WORKS BUDGETING made no definite progress. Establishment of programs and priorities for a number of years ahead and their correlation with a financial program remain academic, cities and states having not yet made a direct attempt to apply the plan. General city budget practice did however make some progress. The wisdom of long-term planning and budget schedules as advocated by municipal research groups received particular recognition in a number of places.

The need for local improvements was strikingly revealed by the great volume of municipal applications for PWA loans, early in the year. The total of the applications greatly exceeded the money actually allocated, and it is probable that many of the projects involved will be carried out on local initiative and by local means when the prospect of federal grants vanishes. It may be recorded that many cities which received PWA allocations for specific projects accepted a grant but declined a loan, preferring to raise the money by bank and bond issue financing on their own credit, and finding that they could do so at lower interest rate than that asked by the PWA. These rates are in fact so low as to make the undertaking of needed public works unusually attractive. Thus, conditions favor the active resumption of local improvement construction at an early date. Against this are the unfavorable attitudes developed through the WPA's forced emphasis on small projects and its large-scale entry into the field of local public works by carrying out much permanent construction for cities, usually at no cost to the latter beyond the necessary materials.

STREET PAVING showed little activity during the past year; such work as was done showed some advance in refinement of materials and workmanship without essential change in types of construction or in the elements of pavement structure. Base construction for bituminous or brick wearing surfaces received more careful attention to reduce cracking. Increased use of high-strength concrete, wire-cut lug brick, vertical fiber brick, deaired brick and thinner wearing surfaces is to be recorded. Resurfacing of old pavements was done on a notably large scale in the relief program.

WATER-SUPPLY CONSTRUCTION was carried on in substantial volume. Of the four large supply projects of the country, two (Los Angeles and Denver) involve bringing water long distances, two others (Milwaukee and Cincinnati) are purification projects. The latter is a major revamping of what when built was considered the last word in the present type of rapid sand filters. Treatment trends in 1935 continue toward better and more positive preliminary preparation of water prior to filtration, and here mechanical equipment is playing an increasingly important part, especially in mixing and flocculation control. Practically all new plants have softening equipment or provision for its installation if the raw water has a hardness above 100 p.p.m. The use of

anthracite coal as a filter medium has found favor in a dozen or more plants and has been proposed for the Denver waterworks. Activated carbon is used in more than 400 plants and a number of places have adopted chlorine and ammonia treatment to meet the growing public demand for taste- and odor-free water.

Distribution systems have been receiving careful thought, as manifested by wider attention to leakage surveys, to cleaning mains in place and to the installation of high-service storage and elevated tanks. The report of the Committee on Friction Coefficients for Pipelines of the New England Water Works Association cast new light on the subject of pipe depreciation as the data showed faster loss of capacity than heretofore believed. In general an increased and more far-sighted consideration of water supply needs grew out of the shortages resulting from the recent droughts.

IN SEWERAGE AND SEWAGE DISPOSAL particular activity developed, under the spur of a growing public understanding of sanitary needs. The large number of treatment plants projected or put under construction during 1935 is tangible evidence. Initiated principally with the aid of federal funds (489 projects have been approved by the PWA), this new work is the forerunner of an era of wide development of sanitary facilities.

Many technical advances contribute in detail to the improvement of existing treatment methods. Chemical precipitation, hailed by enthusiasts three years ago as a process which would ultimately supersede and outmode all other forms of treatment, has been appraised more sanely; its limitations and advantages are now being established and to this end the exhaustive report of the Committee on Sewage Disposal, American Public Health Association, made a large contribution.

While there is small likelihood that biological processes will be abandoned, the increasing tendency toward mechanization is a portent that chemical-mechanical devices are rapidly finding a wide field of application. Vacuum filtration and incineration emerged as the logical means for solving the troublesome problem of sludge disposal. The Chicago Sanitary District has installed a 40-ton incinerator at the recently opened Calumet plant which employs a vapor drying and flash combustion system. Dearborn reports continued satisfaction with incineration and it is possible that a sludge incinerator may be incorporated in the new Cleveland Easterly plant.

REFUSE COLLECTION brought little advance in method, largely because of the continued enforcement of municipal economy measures, which curtailed replacement and development of equipment. In the field of garbage disposal, interest has centered around the possibilities of grinding and discharging the material into sewers for transportation with sewage. This method was adopted in St. Louis in February, 1935, and a daily average of 400 tons (summer load) of finely ground garbage is discharged into the Mississippi River via a two-mile trunk sewer. Baltimore and Indianapolis experiences indicated that mixtures of sewage and garbage could be effectively treated at their respective sewage disposal plants. There has been comparatively little incinerator plant construction and the major activity in garbage reduction has been the revamping of the Philadelphia installation and the reconditioning of the Indianapolis plant.

TRAFFIC CONTROL PROBLEMS became distinctly more serious. Street traffic continues to take a heavy toll of human life despite strenuous safety drives. Evanston, Ill., and Milwaukee, Wis., prove to be the safest cities from the standpoint of automobile accident hazards, thanks to a rigid adherence to a program of pedestrian education, engineering attack on traffic problems and law enforcement. Street widening and "channelizing" traffic at dangerous intersections has aided a few cities in preventing the usual yearly accident increase. Evanston installed an improved lighting system in 1935 but depends mainly on rigid traffic regulations to promote safety. The consolidation of all Chicago parks under one head has resulted in standardized traffic signals and rules and this together with the practice of shifting lanes on boulevards to accommodate morning and night loads is expediting traffic movement. The abandonment of several street-car lines in New York and the substitution of buses has reduced congestion on important thoroughfares. Oklahoma City and Dallas have found parking meters a boon to shoppers. Double parking is still common in Denver and many other cities of its class. Detroit, one of the worst offenders in the matter of traffic handling, has another survey under way and among other recommendations the need for better signalization and illumination on 100 miles of main thoroughfares has been stressed.

* * *

Engineering and Construction

ENGINEERING ADVANCE has no quantitative measure, but the work done and the research and development activities in progress testify to forward movement fully equal to that of any comparison period. Research activity is notable especially in view of the unfavorable financial conditions. Investigative procedure has been extensively refined to meet the necessities of difficult project planning. Design has advanced correspondingly, under the pressure of demands for economy and efficiency. Development or practical introduction of new materials—new alloys, modified cements, building units and composition, glass brick, special bridge and building floor constructions—is a significant current contribution to the art. Construction practice shows equal advance.

THE CIVIL ENGINEER'S ECONOMIC POSITION improved decidedly during the year, in harmony with the revival of investment and capital-goods activities and the resultant rebirth of private construction. By midsummer the Pacific Coast region reported that few able engineers were without work of some sort; in the Middle West the same condition was reported late in the year. In the East there still is a large amount of engineering unemployment. How permanent the partial improvement will be is uncertain, as much of the demand for engineers during the latter part of the year was due to pressure on cities to get their PWA operations under contract. Consulting engineers generally have not enough work at normal rates of compensation. However, the improved financial condition of engineering societies and the upturn in their membership testifies to the reality of engineering recovery.

PROFESSIONAL MATTERS also show progress. Eight states adopted registration laws in 1935, bringing to 35 the number of states that have laws governing the practice of professional engineers. New states added were Alabama, Connecticut, Maine, Nevada, New Mexico, Oklahoma, Utah and Washington; Connecticut and Maine are the first of the New England states to adopt registration laws. Laws are under consideration in ten

other states, and a concerted move is being made to have registration adopted for the District of Columbia. Enforcement of license laws and their effect on the defined status of the profession made some progress.

In the engineering schools there was an upturn in enrollment, indicating renewed optimism as to the future of engineering as a field for young men. Accrediting of engineering schools was begun during the year by the Engineers Council for Professional Development; it promises to be a material help in raising standards of engineering education.

CONTRACTING MARKED TIME, experiencing no material gain in organizational unity or in volume and stability of business. Its operations until near the close of the year, when the improvement in private construction began to take effect, were confined chiefly to public works of the emergency program, whose unemployment-relief character dictated restrictions as to minimum wages, working hours and sources of employment that are foreign to normal contracting procedure. Under these conditions a moderate amount of business, about one-third of normal, was maintained throughout the year; a sharper rise in volume occurred as the year closed. A noteworthy incident of the year was the financing with relief money of a census of contracting by the Bureau of the Census as a part of a general census of business.

CONSTRUCTION TECHNIQUE exhibited improvement out of proportion to the small volume of total operations. Most spectacular progress appeared on the huge federally financed projects in such operations as the deep sheetpile driving at Fort Peck dam and the belt conveying of excavation spoil at Grand Coulee dam, but improvement was shown also in tunneling, bridge erection, production of concrete and mass excavation and fill. Volume, speed and quality of production were bettered. Invention in meeting new problems was evidenced by such operations as foundation well boring for the new post office at New York and for the Fort Peck dam spillway, and the lateral moving of concrete pavement in New Jersey. Especially notable is the advance made in grouting foundation rock on the TVA work.

Supplementing the advances in construction technique, distinct improvement was made in construction equipment, more generally by perfection of construction than by invention of new devices. Cement is being delivered by air pressure over longer distances than ever before, more drills are being operated on one jumbo, more steam hammers for pile driving are mounted on a single gantry, and larger machines are avaliable for trimming subgrade and for placing concrete, whether on road or in canal.

* * *

Industrial Relations

INDUSTRIAL PROBLEMS of construction were affected by several outstanding developments in industrial relations. Control of business, wage and hour regulations, social-security laws and laws aimed to regulate employer-employee relations were among these developments.

The abrupt end of the NRA code system is most prominent among the year's industrial happenings. Most significant feature of code termination was the absence of shock to business and industry. Price wars, revival of cutthroat competition, depressed wages, and wholesale increases in unemployment had been feared; none of these effects were realized.

THE CONSTRUCTION CODE was one of the few that embodied no attempt at price-fixing, and was the only one in which labor had a direct voice. Its intent was: to establish fair bidding practices; to set up minimum standards of wages and working hours; and to formulate area agreements for labor regulaton. It failed mainly because of lack of enforcement and blunt refusal of public-works officials to abide by code regulations. The formation of area agreements was a hopeless task.

CONSTRUCTION LABOR RELATIONS were affected by influences other than the code. Chief of these was the emergency public-works program fixing of minimum wages and maximum hours. By the opening of 1935 a definite policy had been established in stipulating minimum wages to be paid for each class of labor. The WPA "security wage" scales threatened for a time to disrupt construction labor policies, but this fear proved to be groundless.

In organized construction labor an event of importance was the apparent truce reached between the two factions of building trades that had been quarreling for some time.

Movements and events outside the direct field of construction may have some bearing on construction labor relations in the future. One of these is the move toward vertical or industrial trade unions, led by the miners and threatening to spread to other fields. Steel, cement and lumber are allied construction industries that are possible fields for this movement. That the long-established craft unionship in construction will be replaced by a vertical union is a remote but interesting possibility.

LABOR LEGISLATION of various sorts has at least an indirect and in some cases, a direct bearing on construction. The Labor Relations Act provides for federal investigation of complaints of unfair labor practices. So far no construction case has come before the Labor Relations Board. The Motor Carrier Act, providing for federal regulation of trucks and buses, may have an influence on the design and construction of highways. The Guffey Act, setting up labor and trade practices within the coal industry, does not affect construction, but it will serve as an indication of the possibilities of industry self-regulation. The Social Security Act passed last summer taxes every employer, including the contractor, for its support. A payroll tax of one per cent is now in effect; this will be raised to two and three per cent in the next two years.

COMPENSATION LAWS continue to become more liberal, at least in their interpretation, resulting in constantly-increasing premium rates. The latest move is toward inclusion of all occupational diseases as compensable. This brings the troublesome silicosis question into the field of compensation. North Carolina has what appears to be a sane and fair silicosis compensation law; those of other states are lacking in many particulars.

Contract prices seem to be better than they were a year or so ago. In some places bid depositories are in use to insure sound bidding practices, though except for steel fabricators and a few highway-contractor associations the plan is apparently limited to subcontracting.

In summary, 1935 was a momentous year in industrial relations. Actual disturbances were far fewer than might have been expected. As a result, 1936 opens with labor and industrial relations more stabilized than for some time, and nothing on the immediate horizon appears likely to disturb this condition.

Business and Construction

STEADY UPTURN in business matched by increase in private construction that carried the year's total to 3.7 billion dollars, a gain of 19 per cent over 1934. Similar gain in 1936 likely as private industrial and residential building continue to improve

CONSTRUCTION went hand in hand with general business in a steady march toward recovery during 1935, the year closing with activity at the highest level in five years. At the end of the previous year business was on the rise, and the advance continued with only slight seasonal setbacks; production and trade were constantly on the increase, especially since midyear.

The Federal Reserve Board reports 1935 industrial production 13 per cent ahead of that of 1934; *Business Week's* index of business activity showed an average gain of 6 per cent for the year. All-time high records were established in some lines, including electric power consumption, certain electrical equipment, gasoline consumption and air-conditioning equipment. Other lines reached five-year and six-year highs; among these are automobile and steel production, shipbuilding, and mail-order sales.

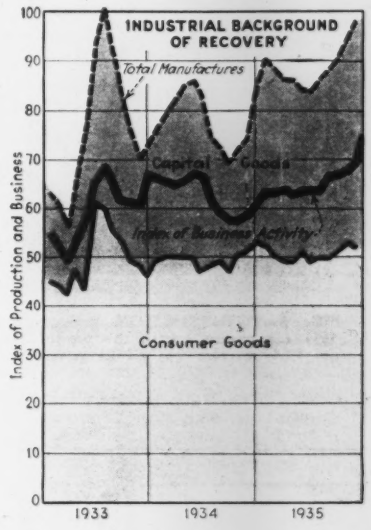
Gains in construction during 1935 paralleled the rise in business. The total of all 1935 construction, including heavy maintenance, is estimated at $3,681,000,000 an increase of 19 per cent over the 1934 volume. Private work accounted for almost all of the increase in construction; private engineering and industrial building showed a gain of 64 per cent and residential building a gain of 92 per cent. The volume of public works remained about the same as for the previous year. Table I details the estimated figures. Despite the growth in construction, however, construction cost held constant.

At the present time business activity is 60 per cent above its low of 1932, and has recovered about half of the ground lost since 1929. Construction has reached a level of activity 51 per cent above its low (1933), but so far has come back to only 42 per cent of the 1926 normal volume and is operating at only 35 per cent of the 1929 peak.

Business summary

Following is a summary of business during 1935 and the general outlook, prepared by David Dillman, economist of *Business Week:*

Economic recovery in the United



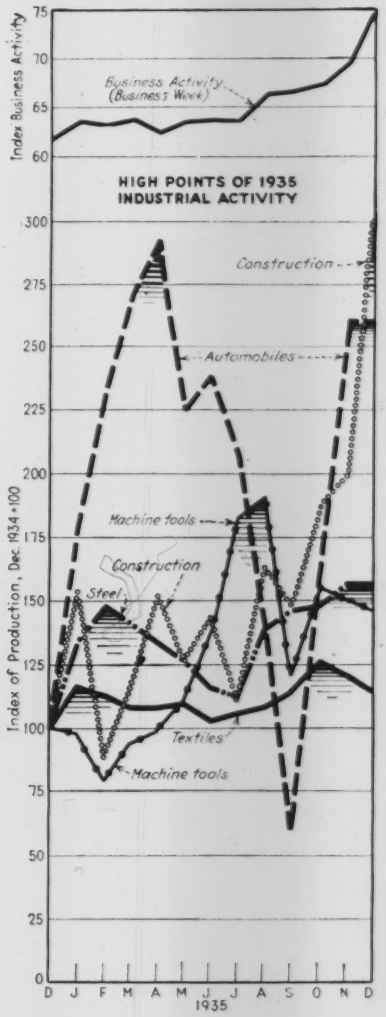
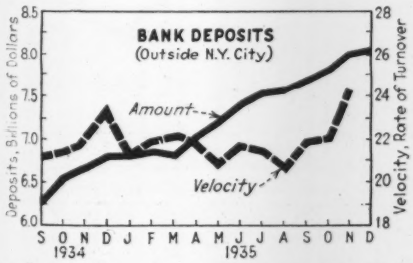
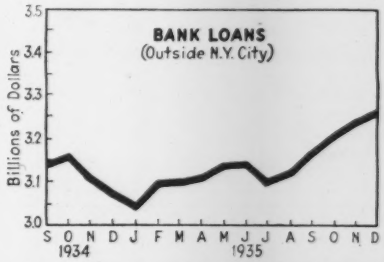


FIG. 2—UPSWING in capital-goods production accounted for the rise in business in 1935, for consumer-goods productions remained constant. The 1935 peaks of industrial production are spotted on the chart at the right.





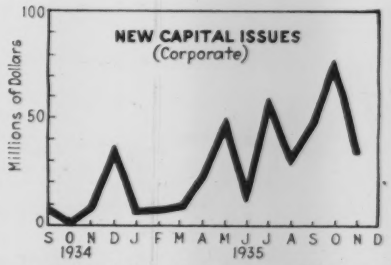


FIG. 1—IS MONEY going to work? Big bank deposits, long idle, showed slightly greater turnover as 1935 ended; bank loans recorded a scant expannsion; the capital market included some new financing among its refunding transactions.

States is too conclusively apparent to require demonstration. The promise contained in half-hearted upturns in 1933 and 1934 was definitely confirmed by the broad forward movement last year. A year that was ushered in on one of the recurring rallies in consumption goods ended on the most constructive and encouraging note in the economic symphony—an impressive upturn in construction.

Natural forces directed the year's developments. National income, which had shrunk from an 81-billion dollar high in 1929 to a low of 39.5 billions in 1932, crept back up to an estimated 52.7 billions. Better incomes in city workshops and on the farm gave volume and profits to retail trade. The automobile manufacturers capitalized a revival of buying power and contributed business to a broad segment of supplying industries. Steel tonnage swelled, largely on automobile orders, but also on business with makers of farm implements, household appliances, refrigerators, construction materials and machinery.

The demand for goods convinced industry that there were opportunities in rehabilitating long-neglected plants, and as a result orders poured in upon the machine-tool industry that taxed facilities and exhausted the skilled labor supply. It is this upturn in construction and machinery lines that signally distinguishes 1935 and gives a bright hue to 1936 prospects.

What happened in this direction in 1935 barely scratched the surface. A national factory almost five years behind its normal maintenance program requires tremendously greater rehabilitation than has yet been undertaken. Any expansion in capacity, any new undertakings, must come on top of such rehabilitation.

As to the financial machinery back of these advances: To date, the capital-goods progress has been made mainly on a cash basis. Credit and capital have not yet come into play to any extent, though they are made available in greater quantity and at lower cost than ever before in the history of this country.

Bank deposits, at an all-time high, stagnated until the closing months of 1935, when they started a slow acceleration of turnover. New bank loans have barely been able to replace the drain of liquidation of old accounts. The market for new capital, reopened early in 1935 by simplification of government regulations, devoted itself to refinancing throughout the greater part of the year; it has yet to encounter any appreciable demand for new money.

Thus the bloated banking system contains explosive elements which must be recognized in any contemplation of future possibilities for business.

Economic history, while it does not repeat itself in detail, shows similar broad characteristics in recurring periods, and we may say for illustrative purposes that 1936 starts somewhat like 1925. The wreckage of depression is mostly removed. Commodity surpluses have disappeared, liquidation is completed, fright has been overcome. A revived business spirit is offered the same liberal credit accommodations that were provided in 1925, but in measurably greater volume.

Money and ideas are a magical combination from which comes economic progress. In 1925 they gave us three years of wholesome expansion but went on into two years of speculative excess. At the present time the danger of excesses is remote; we are not at that stage of the cycle, and it is more likely that too much restraint will be carried over into 1936.

And whatever mistakes may be made in 1936 will be little ones. Production may run momentarily ahead of demand in spots and spoil the clean inventory situation; if so, the broad upward sweep will be punctuated by checks. But the

TABLE I—ESTIMATED VALUE OF ALL CONSTRUCTION IN UNITED STATES
(Millions of Dollars)

	Residential	Public Works	Other	Total	*ENR* Cost Index
1919.....	1,160	1,640	740	3,540	198.42
1920.....	706	1,470	1,204	3,380	251.28
1921.....	1,100	1,510	860	3,470	201.81
1922.....	1,675	1,780	1,445	4,900	174.75
1923.....	1,980	2,300	1,590	5,870	214.07
1924.....	2,120	2,500	1,610	6,230	215.36
1925.....	2,704	2,476	2,998	8,178	206.68
1926.....	2,676	2,670	3,532	8,878	208.03
1927.....	2,544	3,073	3,978	9,595	206.24
1928.....	2,796	3,480	4,304	10,580	206.78
1929.....	1,934	3,263	5,180	10,377	207.02
1930.....	1,103	3,363	3,592	8,058	202.85
1931.....	812	3,098	2,020	5,930	181.35
1932.....	281	1,918	640	2,839	156.97
1933.....	249	1,533	658	2,440	170.28
1934.....	249	2,373	482	3,104	198.10
1935.....	479	2,460	742	3,681	195.22

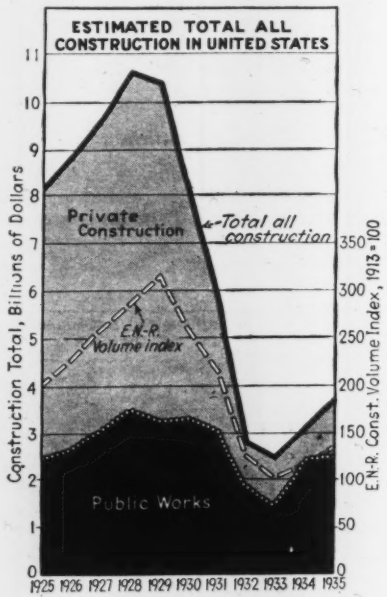

ESTIMATED TOTAL ALL CONSTRUCTION IN UNITED STATES
Private Construction
Total all construction
E.N.-R. Volume Index
Public Works
Construction Total, Billions of Dollars
E.N.-R. Const. Volume Index, 1913=100
0 1 2 3 4 5 6 7 8 9 10 11
0 50 100 150 200 250 300 350
1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935

FIG. 3—CONSTRUCTION maintained in 1935 the upturn started the previous year; the 1935 increase was all in private work.

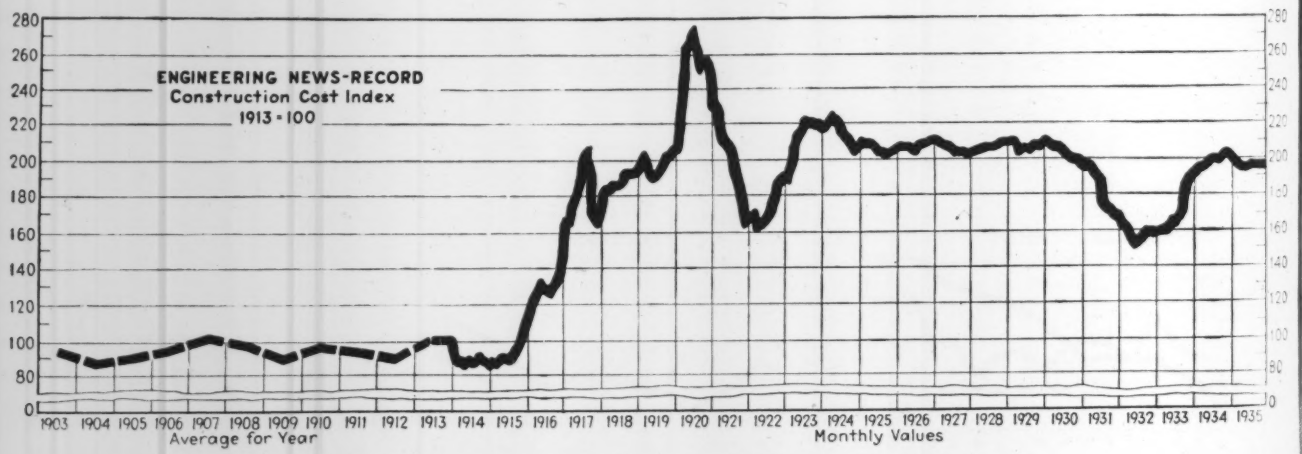


FIG. 4—TREND of construction costs for the past 32 years is indicated by the *ENR* cost index. Costs in 1935 were unusually stable.

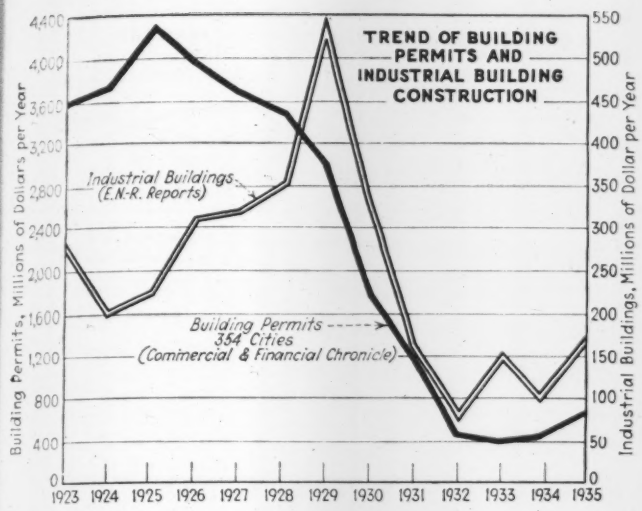

TREND OF BUILDING PERMITS AND INDUSTRIAL BUILDING CONSTRUCTION
Industrial Buildings (E.N.R. Reports)
Building Permits 354 Cities (Commercial & Financial Chronicle)
Building Permits, Millions of Dollars per Year
Industrial Buildings, Millions of Dollar per Year
1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935

FIG. 5—BUILDING PERMITS showed a tendency to move upward last year, while industrial building construction climbed away from the 1932 and 1934 lows.

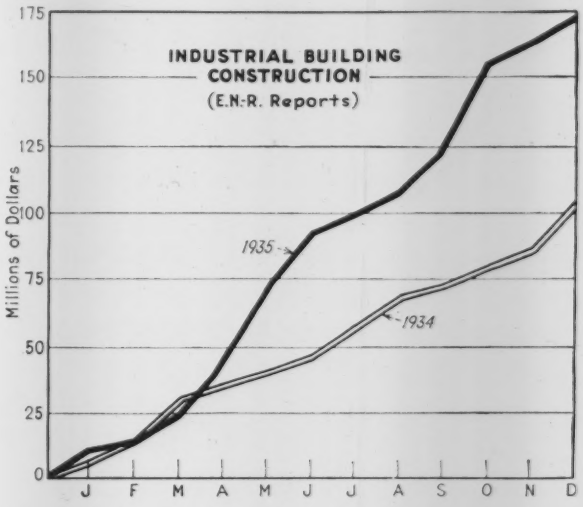


FIG. 6—INDUSTRIAL BUILDING construction broke loose in March and maintained a steady increase for the remainder of the year, one of the bright spots in 1935 construction.

momentum of recovery and the nice dovetailing of constructive elements in the picture will carry the economic machine over any molehill obstacles of this kind.

The manner in which the shocks of foreign and domestic disorders were absorbed in 1935 makes it difficult for a commentator to foresee any event in 1936 that could be powerful enough to derail the recovery. Internally there will be a bitter political fight; abroad war or its threat clouds the horizon; there are still phases of New Deal reforms that must be revised or discarded. But in 1935 the regulation of industry, labor and non-agricultural prices was abandoned without causing a quiver. A new farm program this year should be no more disturbing.

There will be more currency troubles abroad. France will probably go off gold, but this may be the means of taking the rest of the world back. Barriers to foreign trade are gradually dropping despite the current emphasis on nationalism. At home, currency inflation is a dead issue. The bonus will mildly stimulate consumption lines and automobile sales, and will slightly increase the tax burden.

On the favorable side of the picture are factors like reviving construction, which, because of modern conceptions of adequate housing accommodations, will bring even wider benefits to other industries than housing booms have brought in the past. There are industries, such as the railroads, which have not started re-equipping but will be forced to do so by modest increases in business. Others, like the electrical utilities, already have capacity business and must expand to meet demands.

Construction volume increases

Precise computation of the country's total construction volume is impossible. Estimates only can be given. Based on the *ENR* construction reports and other known factors, the estimated total of 1935 construction of all types is $3,681,000,000, of which $2,460,000,000 is public works and $1,221,000,000 is private engineering, industrial and commercial building and residential construction.

State and municipal work was only about three-fourths of the previous year's volume, due mostly to a delayed start in the highway program. Federal construction showed an increase sufficient to bring the total of all public works to a slightly higher volume than that of 1934. Private engineering work, which includes multiple-family dwellings, is estimated at $742,000,000, a gain of 54 per cent over 1934, while single-family dwellings are estimated at $479,000,000, a gain of 92 per cent—the first upturn for this class of work since 1929.

Large gains in private work

The resumption of private work is of great importance, for private construction normally constitutes about two-thirds of the total. Starting in 1930, the ratio of private to public work dropped, until in 1934 only 24 per cent

TABLE II—ENGINEERING CONSTRUCTION CONTRACTS REPORTED BY *ENR* IN 1935

(Thousands of Dollars)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States 1935	United States 1934	Canada 1935	Canada 1934
Public Works										
Waterworks	5,132	12,304	6,293	9,012	12,541	35,395	80,677	92,495	2,987	1,210
Sewerage	9,477	32,332	5,752	20,725	12,919	18,730	99,935	61,068	1,266	1,436
Bridges, public	4,062	29,269	6,944	14,986	22,148	9,452	86,861	88,800	2,387	5,597
Earthwork and waterways	10,535	29,250	91,379	35,452	49,372	42,752	258,740	266,431	16,375	2,635
Streets and roads	20,334	52,003	62,067	59,088	92,603	39,168	325,263	345,066	16,113	11,834
Buildings, public	24,633	104,385	35,639	38,144	59,226	35,831	297,858	204,185	15,555	10,463
Unclassified, public	3,871	42,571	2,553	4,144	6,353	10,186	69,678	61,288	8,814	3,768
Total public	78,044	302,114	210,627	181,551	255,162	191,514	1,219,012	1,119,333	63,497	36,943
Federal gov't (included in above classification)	19,385	57,319	111,592	56,287	67,892	49,790	362,265	360,166	.....	.....
Private										
Bridges, private	17	8,284	109	696	1,916	50	11,072	10,044	25	.....
Buildings, industrial	7,225	40,182	17,160	71,582	14,282	22,036	172,467	105,192	10,933	7,499
Buildings, commercial	5,908	75,239	4,454	10,739	6,730	5,747	108,817	80,685	5,799	2,541
Unclassified, private	10,437	16,121	12,953	15,926	17,046	6,300	78,783	45,342	754	944
Total private	23,587	139,826	34,676	98,943	39,974	34,133	371,139	241,263	17,511	10,984
Total—1935	101,631	441,940	245,303	280,494	295,136	225,647	1,590,151	.....	81,008	.....
Total—1934	100,432	273,556	214,803	226,571	310,325	234,909	.....	1,360,596	.....	47,927

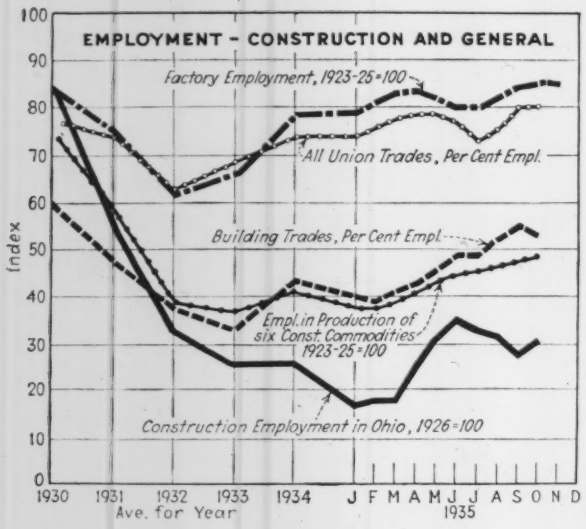

EMPLOYMENT - CONSTRUCTION AND GENERAL
Factory Employment, 1923-25=100
All Union Trades, Per Cent Empl.
Building Trades, Per Cent Empl.
Empl. in Production of six Const. Commodities 1923-25=100
Construction Employment in Ohio, 1926=100
Index
Ave. for Year
1935

FIG. 7—EMPLOYMENT, both factory and construction, registered a general upturn last year, reaching three-year to five-year highs.

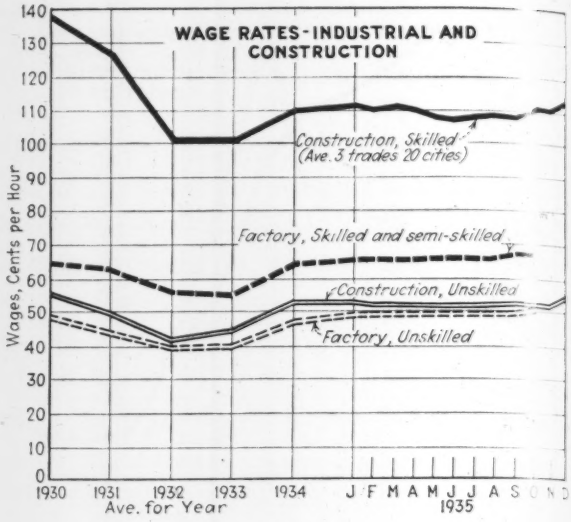


FIG. 8—WAGES in industry and construction remained unusually stable throughout the year, showing very slight gains over 1934.

of all construction was private work. In 1935 the ratio rose to 33 per cent.

Industrial and residential building were the two main elements involved in this decisive reversal of trend. In March, 1935, industrial construction began a spurt that carried it 64 per cent ahead of the 1934 volume by the end of the year (Fig. 6). Very little industrial building and expansion had been undertaken for the past four years. Consequently the first upward move in industrial production encountered obsolete plants further hampered by an accumulation of deferred maintenance, necessitating immediate rehabilitation, rebuilding and wholly new construction.

Industrial building was not the only factor in the upswing of private engineering construction. Commercial building also followed the rising tendency, with an increase of 35 per cent over the 1934 volume; it still remains far below the normal level, however. Miscellaneous private work (a relatively small volume) increased during the past year, and even private bridge construction showed a 10 per cent gain.

Residential building turned from a six-year steady decline to a slow rise late in 1934, and gained momentum throughout 1935. Building permits in 1935 registered a gain that accelerated to a 67-per cent increase over the previous year's total.

The geographical distribution of current construction also is significant. Beginning in 1930, when industrial and commercial building started to decline, the West and South had steadily gained in their share of the country's construction volume, and the trend continued throughout 1934. It was checked in 1935, when the industrial East and the Middle West once more gained at the expense of the West Coast, the South and New England. In 1930, for example, the Middle Atlantic states accounted for 40 per cent of the nation's construction: by 1934 their share had dropped to 20 per cent, but in 1935 it made up nearly half the loss, increasing to 28 per cent.

TABLE III—CORPORATE, STATE AND MUNICIPAL FINANCING

(Millions of Dollars)

	Total Financing Incl. Refunding*			New Productive Capital		
	Corporate	State and Mun.	Total	Corporate	State and Mun.	Total
1925	$4,222	$1,400	$5,622	$1,966	$1,352	$3,318
1926	4,574	1,365	5,939	1,824	1,344	3,168
1927	6,507	1,510	8,017	1,784	1,475	3,259
1928	6,930	1,425	8,345	1,568	1,379	2,947
1929	9,376	1,431	10,807	1,758	1,418	3,176
1930	4,757	1,487	6,244	2,032	1,434	3,466
1931	2,371	1,256	3,627	787	1,235	2,022
1932	643	849	1,484	159	561	720
1933	380	520	900§	292†	1,091‡	1,383
1934	490	939	1,429§	77†	1,011‡	1,088
1935	2,267	1,215	3,482§	47†	1,705‡	1,752

*From Commercial and Financial Chronicle.
§PWA Financing not included.
†Includes $237,000,000 PWA loans, '33; $55,000,000, '34; $9,000,000, '35.
‡Includes $814,000,000 PWA loans and grants, '33; $580,000,000, '34; $1,208,000,000, '35.

Construction financing

New productive capital made available in 1935 for construction purposes totaled $1,782,000,000, exclusive of appropriations and allotments for federal work. Of this amount the bulk was PWA grants and loans which amounted to $1,208,000,000. Other state and municipal financing was $497,000,000, about double that of the previous year. New productive corporate issues sank to a new low, $47,000,000; in 1930 the total exceeded two billions.

Total bond and stock issues for 1935 present a different picture, for there was heavy refunding of old obligations, especially in the corporate field. The total of all financing, new productive and refunding, reported by *Commercial & Financial Chronicle*, (excluding PWA) amounted to $3,482,000,000, of which $2,267,000,000 was corporate. These are the highest figures reported in four years, approaching the 1931 level. Data on financing are given in Table III.

The bond market during 1935 showed further improvement over the remarkable rise experienced during 1934. Municipals made especially notable advance, though U. S. Treasury and corporate issues also gained substantially. Table IV, showing yield of four classes of bonds from 1932 to date, reveals the strengthening trend of the market. A list of high-grade long-term municipals yielded an average of 3.17 per cent in 1935, as compared with 3.95 per cent for 1934 and 4.71 per cent for 1933. The upward trend in corporate bond prices is evident from the steady drop in yield in Class Aaa issues from an average of 5.01 per cent in 1932 to 3.75 for 1935; Class Baa showed even greater increase in prices, the average yield dropping from 9.30 to 5.85 for the same period. The course of the municipal bond market over the past two years may be illustrated by two extremes: Hartford, Conn., 4s for 1950 were listed at 103 in December, 1933, while two years later they were 119½; Phoenix, Ariz., 4½s of 1950 were 64 at the end of 1933 and had risen to 110 by December, 1935.

Additional evidence of improvement in the bond market is found in the numerous changes of PWA loan-and-grant allotments to grants only, at the request of the borrowers, who discovered that the regular market offered them better terms for disposal of their bonds than the government. PWA and RFC have unloaded on the market, and at a profit, many of the bonds they had purchased from borrowers. In fact, PWA has sold to date about 70 per cent of

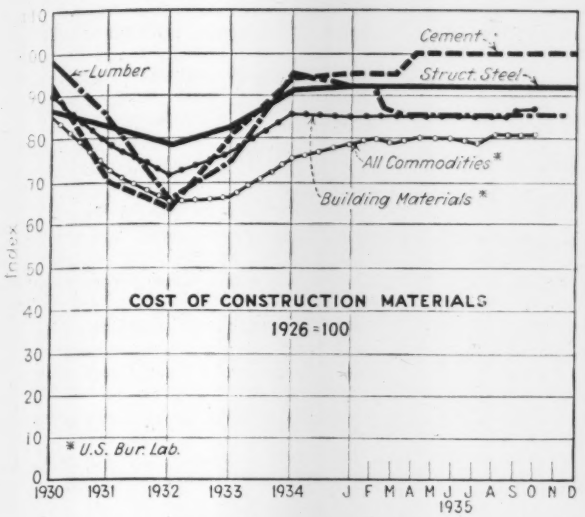

Cement
Lumber
Struct. Steel
All Commodities *
Building Materials *
COST OF CONSTRUCTION MATERIALS
1926 = 100
* U.S. Bur. Lab.
Index
1930 1931 1932 1933 1934 J F M A M J J A S O N D 1935

FIG. 9 — CONSTRUCTION-MATERIAL COSTS showed little change; cement prices increased slightly while lumber prices dipped; steel remained at one level.

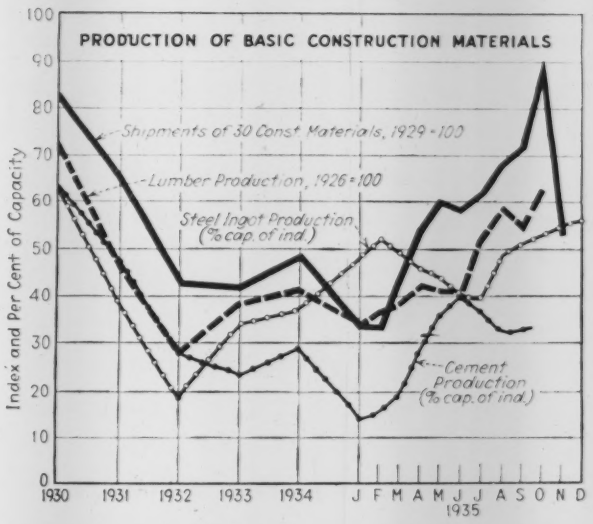

PRODUCTION OF BASIC CONSTRUCTION MATERIALS
Shipments of 30 Const. Materials, 1929 = 100
Lumber Production, 1926 = 100
Steel Ingot Production (% cap. of ind.)
Cement Production (% cap. of ind.)
Index and Per Cent of Capacity
1930 1931 1932 1933 1934 J F M A M J J A S O N D 1935

FIG. 10—PRODUCTION of basic construction materials reflected the upturn in construction volume by reaching the highest levels in several years in most cases.

the municipal bonds it had purchased, or over $300,000,000, at a profit of $4,750,000.

The outlook for continued improvement in the capital market is encouraging. Some of the artificial restraints which have contributed to the severe decline of construction and other durable-goods industries several years ago have been overcome. For example, at first the Securities Act of 1933 made difficult the floating of new securities to provide capital for new enterprises. The Securities and Exchange Commission have now made the Act workable, and capital flotations greatly expanded last year. It is true that almost all the money raised by private enterprise was for refunding, and the flow of strictly new capital was almost negligible. Yet it is now plain that the Securities Act will not be an obstacle when confidence revives sufficiently for the investment of new funds on a large scale in securities for construction and other durable-goods industries.

One of the important background elements of this municipal bond rehabilitation is that tax collections improved markedly over 1934. According to a survey by Lehman Bros., of New York, reports from 61 cities reveal that for the first ten months of 1935, 55 cities collected a larger percentage of current taxes than during a similar period of 1934. This is the second consecutive year that current tax collections in these cities have shown an improvement. Not only have current tax collections been better, but the combined collections of current and delinquent taxes also improved in a majority of the cities reporting. Seven cities collected more than 100 per cent of their 1935 tax levy.

Construction costs little changed

Construction costs did not reflect the increase in volume during 1935, but remained steady after an early-year drop. The *Engineering News-Record* Construction Cost Index, based on the cost of three basic materials (cement, steel and lumber) and common construction wage rates, averaged 195.22 for 1935, a slight drop from the 1934 average of 198.10. Opening the year at 198.72, the index declined to 194.26 in March, and never rose above 195.18 for the remainder of the year, closing at 194.10. A falling off in lumber prices and a slight decrease in labor rates accounted for the lowering of the index early in the year. The index from 1903 to date is shown in Fig. 4.

Apparently construction costs have reached a stable level, and all indications are that this level will be maintained for some time. Prices of materials were little affected by the shock of discontinuance of the codes, and therefore may be expected to resist any tendency to change in the near future. Wages in construction are also stabilized, for the time being at least, since the greater part of work under way provides for definite minimum or prevailing rates.

TABLE IV—BOND YIELDS

	U. S. Treas. (1)	Municipal (2)	Corporate (3) Aaa	Corporate (3) Baa
1932 aver.	3.66	4.65	5.01	9.30
1933 aver.	3.31	4.71	4.49	7.76
1934 aver.	3.10	3.95	4.00	6.32
1935 Jan.	2.83	3.45	3.78	5.99
Feb.	2.73	3.39	3.72	5.97
Mar.	2.69	3.27	3.71	6.22
Apr.	2.64	3.25	3.72	6.14
May	2.61	3.27	3.74	5.99
June	2.61	3.25	3.72	5.86
July	2.59	2.95	3.70	5.77
Aug.	2.66	2.87	3.77	5.69
Sept.	2.78	3.08	3.80	5.62
Oct.	2.77	3.16	3.79	5.63
Nov.	2.73	3.02	3.75	5.50
1935 aver. 11 months	2.70	3.17	3.75	5.85

(1) Aver. all U. S. bonds, except those due or callable within 8 years.
(2) Standard Statistics Co., 15 high-grade long-term issues.
(3) Moody's. 30 issues.

Labor conditions

Wages of construction labor changed but little during 1935. The average wage rate of three skilled trades—carpenters, bricklayers and steelworkers—in twenty cities for the year was $1.093, as compared with $1.097 for 1934. Rates for common construction labor in the same cities averaged 52.76c. in 1935; 53.19c. in 1934. Fig. 8 shows the trend of construction wage rates as compared with those in manufacturing industry.

The past year was remarkably free from labor troubles in construction. The principal disturbances were in WPA work, where hourly rates higher than the President's "security wages" were demanded in several localities. In most cases the authorities capitulated to these demands, especially those of skilled labor, usually by reducing the number of working hours per month and retaining the same monthly wages. Common labor, lacking the organization of the skilled class, did not fare so well in having its demands met.

Labor's fears that WPA relief works wage scales would depress wages in construction, especially in private work, proved to be unfounded. Rates on public works were too well protected to be affected, for prevailing wage or minimum rate clauses were a part of every contract and were stipulated for day labor projects financed wholly in part with government funds. On private work there was no attempt to force construction wages down to relief works level. Any attempt to have done so would have resulted in a storm of severe criticism against both the contractor and the owner.

In general WPA relief works projects greatly alleviated unemployment in construction, especially in the higher type of labor and supervisory classes. On

every project there were certain definite tasks that could be performed only by experienced construction workers. For the common labor jobs construction workers had to compete with unemployed from every other occupation, so it was only in communities that had relief projects of sufficient volume to absorb all unemployed that construction labor fared well.

Re-employment of relief workers in regular construction work has been encouraging. Here, too, the higher class of workers and those with supervisory capabilities have fared best. An example is the works relief project at the Brooklyn Navy Yard, where almost daily foremen, skilled tradesmen and engineers leave for better jobs.

Jurisdictional disputes were scattered and of minor nature. Considerable alarm developed over the lack of apprentice training in the skilled labor trades, which is already threatening a shortage of craftsman in several lines.

Long before the abolishment of the NRA code system it was apparent that the greatest attempt at labor regulation in construction, as represented by the area agreement plan of the Construction Code, was doomed to failure. So little progress was made in the formation of area agreements that the plan was early recognized as unworkable from a practical standpoint; actually only about 50 area agreements were forthcoming in an industry that would require thousands of them. Inability to find truly representative groups of labor was one of the chief obstacles to formation of area agreements.

Employment, both construction and industrial, showed steady gaing during 1935 (Fig. 7.) The percentage of all union members employed fluctuated from 74 to 79 and back to 72 during the first six months, but closed the year at 80 per cent. Building trades employment, while still very far below normal, showed a gain from 40 per cent of union members employed at the opening of the year to 55 per cent in September. The rise in general factory employment was exceeded by that of employment in the production of six major construction commodities. The Ohio index of construction employment, the only one of its kind, showed a remarkable rise over the first half of the year, but a small drop during the second half. While this index indicates a rise in construction employment, it also reveals the sad status of that employment today—only 30 per cent of the normal year 1926.

The future trend of employment in construction depends wholly upon the resumption of private work. Public works employment will remain stationary at best, and will undoubtedly start to diminish during the latter part of the year. However, an upward trend in private work will recall all the experienced construction workers available, for this class of work demands capable experienced workers, and none others will be tolerated.

Materials—prices and production

The cost of construction materials remained unusually steady during 1935. Structural steel went through the year without a change in price; cement prices enjoyed a slight gain about the same time that lumber prices declined slightly early in the year. General building materials followed the same steady course in prices, while the index of prices of all commodities registered a slow but steady rise (Fig. 9).

The production of construction materials in many cases reached four-year and five-year highs during 1935 (Fig. 10 and Table V). A new index of shipments of 30 principal construction materials, based on 1929 as 100, showed a wide fluctuation from 34 in January to 89 in October, averaging about 56 for the year. Lumber production for the year averaged about the same as for 1931, but closed at a rate close to the 1930 level. Steel output was the highest in four years.

The outlook

There are too many uncertain factors in the picture to permit accurate forecasting of the construction trend, but all indications are that the present rate of increase will be maintained. This points to a 1936 construction volume between 4 and 4½ billions, probably approaching the latter.

The 1935 rise in construction came principally from two elements—industrial and residential building. These two elements, with a substantially maintained volume of public construction, define the conditions that lie just ahead of us.

Residential construction in 1935 is estimated at from 65,000 to 80,000 family units. Indications are that this amount of residential construction will be nearly doubled in 1936, and 1937 should bring another doubling. There is reason to believe that we will climb out of the housebuilding depression almost as fast as we went into it, and will reach a normal rate of housebuilding in about three years. As the rate was down to 10 per cent of normal during 1933-34, we have a long way yet to go. After normal is reached it will still be necessary to make up for the deficit that began to accumulate in 1930, an estimated accumulation of some 2,000,000 family units.

Similar deficits in industrial and utility construction provide a basis for the expectation that this class of work also will continue the upward trend evident in 1935. If the capital goods industries continue to improve the expansion rebuilding and repair of plants can no longer be deferred.

Commercial building is expected to come back much more slowly than industrial construction. This class of building is not subject to the same degree of obsolescence and there is no such large deficit to make up at present.

Public works will undoubtedly be maintained at the present rate, at least for the first half of the year. The uncertainty of the administration's attitude toward highways and the questions that surround continuation of PWA and WPA make the charting of the course of public works difficult.

State and municipal construction may suffer a temporary setback if and when government financial support is withdrawn. The local authorities have in large part lost the habit of planning and financing their needed improvement construction, and under the pressure of tax-deduction agitation will probably be reluctant to go ahead aggressively with either pay-as-you-go or bond projects. Many revenue-earning services have been stripped of their surpluses available for improvements and must also await new financing.

On the other hand, the pressure of physical need for better facilities and the demands imposed by new residential construction are certain to result in early resumption of normal progress in improvement construction.

TABLE V—OUTPUT OF LEADING CONSTRUCTION MATERIALS FOR TEN-YEAR PERIOD

Item	Basis	Unit	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	Ratio 1935/1934 Per Cent
Lumber	Production	Millions Bd.-ft.	36,936	34,532	34,142	36,886	26,051	16,523	10,159	13,961	15,039	15,845	105
Cement	Shipments	Thous. bbl.	161,784	170,928	175,452	169,440	159,558	126,465	80,529	64,086	75,917	74,445*	98
Steel ingots	Production	Thous. tons	46,936	43,777	50,325	54,850	39,595	25,193	13,323	22,594	25,599	33,426	131
Fabricated structural steel	Shipments	Thous. tons	3,218	2,854	3,122	3,307	2,987	1,812	942	898	1,116	1,105*	99
Fabricated steel plate	New orders	Thous. tons	516	500	628	639	569	303	162	198	242	255*	106
Explosives	Shipments	Thous. lb.	513,876	477,324	455,184	484,596	424,920	325,440	227,508	249,366	305,577	290,348*	95
Sand-lime brick	Shipments	Thous.	.....	205,080	205,320	172,644	102,552	64,500	27,003	12,427	11,170	15,713*	141
Face brick	Shipments	Aver. per plant	13,512	13,200	12,948	11,964	8,496	5,388	2,303	1,791	1,908	2,474*	130
Repared roofing	Shipments	Thous. squares	.....	.....	36,540	39,864	27,876	22,592	22,208	23,883	23,594	24,687*	105

*Preliminary figures.

Science and Practice

Reviewed by Hardy Cross, J. L. Savage, Harrison P. Eddy, M. O. Withey, P. J. Freeman and J. F. Crane

APPRAISAL of developments in six fields of civil engineering that are in active movement give an evaluation of recent progress and present trends. They furnish an authoritative basis for estimating the direction and rate of advance in the immediate future, as predicated upon past achievement.

Structural Knowledge

HARDY CROSS
Professor of Structural Engineering, University of Illinois, Urbana, Ill.

IN THE FIELD of structural engineering the past year has been one of consistent development rather than of spectacular accomplishment. With its usual vigorous digestion, the structural art has consumed masses of analytical material and results from model studies, data from laboratory experiments on materials and on details. The results of this digestive process will appear in structures that are yet to be built.

Most important completed bridges of the year are the great New Orleans crossing of the Mississippi—a structural dream for over 50 years—and the suspension bridge at Davenport. At our two great ports, the Triborough Bridge is under construction at New York, Golden Gate and the Bay bridge with the great East Bay cantilever at San Francisco. The giant builders are still with us; to realize this, compare the moderate publicity given to the 500-ft. continuous spans at South Omaha with that which they would have received twenty years ago!

Notable research work

The engineers of the San Francisco-Oakland Bay Bridge praiseworthily recognized their indebtedness to the engineers of the past by financing extensive tests of riveted joints. Large joints under static load are being tested at the University of California; fatigue tests of smaller joints are in progress at the University of Illinois. These promise to rank among the greatest experimental researches in structures. Most important, however, is recognition that each major structural project has a debt to the past that can be paid only by a contribution to the future.

Reconsideration of fatigue as an element in design is shown also by tests on reversed loading of welded joints at the University of Illinois and by renewed consideration of the subject by technical committees. Some will recall discussions of the topic at the beginning of the century, though on a rather different basis of thought.

The use of alloy steels continued, both in such large structures as the East Bay cantilever, where over half the tonnage is of alloy or heat-treated steel, and in small highway bridges. The latter tendency is especially noteworthy. Investigations of the desirability of utilizing structural aluminum in special cases continue.

Dynamic studies

Earthquake-resistant design received attention on the West Coast. To designers elsewhere this work is important in developing clearer understanding of continuous action in structures and especially in awakening interest in structural dynamics. It is literally true that the profession has been shaken out of its apathy in these fields.

In another way the work of J. B. Hunley for the American Railway Engineering Association is notable in the field of dynamics. His analytical approach stems from the work of Inglis in England, but the interpretation is distinctly American. His investigations and the work on earthquake resistance promise renewed attack on a problem that is so often raised only to be avoided: clearer definition of the significance of rigidity.

The American Railway Engineering Association adopted a new specification for steel railway bridges, previously presented for discussion. This is the first general revision in fifteen years. Notable clauses deal with increase in basic working stress, a new formula for stiffener spacing, revision of the rules for computing net section and new specified impact.

Timber again receives systematic attention. Tests of the resistance of timber floors to earthquake forces were made in California, tests of laminated floors of timber and of laminated timber arches at Illinois. Best of all, the West Coast built timber bridges with some of the grace of those of 50 years ago.

Brick, reinforced, once more promises to regain to some extent its position as a structural supporting material instead of a mere covering.

Rise of the rigid-frame structure

The structural type-of-the-year is definitely the rigid frame. The remarkable tests on concrete arches at Illinois are now followed by tests on rigid frames of concrete and on knees for rigid frames of various details of design. At the Bureau of Standards, tests on rigid frames of steel are in progress.

Definitely important are developments in design of highway bridges of moderate span. These were at one time, with industrial buildings, the most poorly designed and often the most poorly planned of our structural types. More and more the state highway bridge offices, cooperating with the Bureau of Public Roads, have broken away from standardized precedent and have become important organizations for research in design; new types appear, old types are improved, and special attention is given to important details of design. Continuous structures are more in use, deck girders supplant through girders, "in order to accentuate the roadway as a main-purpose element of profile." Excellent! This calls for a better type of engineer: pay him!

Notable is the increased use of rolled beams for spans of more than 100 ft. Important is the attention to the design of floors; very promising the rethinking of abutment and pier design; more important the attention to functional and es-

thetic design. The small highway bridge becomes again a problem in civil engineering and not a specialized problem in structural engineering.

In the analytical field, interest in analysis of continuous structures continues. Much of the work has shown acute obsession for fragments of knowledge, meticulous attention to details of computation, too little concern with unified concepts of structural action. On the whole, however, the activity is distinctly healthy, as the younger engineer develops a clearer picture of structural action; the work is valuable so far as it develops tools of thought rather than standardized types of thinking.

Studies by models and by polarized light continue to occupy our attention. At Lehigh, studies by polarized light were used to supplement laboratory tests of welded joints. Models continue to be used for dynamic studies at Stanford and elsewhere on the West Coast and at the Massachusetts Institute of Technology, and in general for problems varying from the erection procedure on the Davenport Bridge to such quaint and curious academic tasks as that of drawing influence lines for the effect of transverse loads on a two-legged bent.

Originality marks the day

This depression period has been one of originality in architectural form and in structural type—rigid frames, shell domes, and in the state of Washington a relatively long bridge truss of unusual form in reinforced concrete. It has been even more a period of experiment, of analysis, and of revision of concept.

The beginner wonders if the mass of theoretical and experimental material, the data as to new materials, new forms, new details can ever be assimilated into the structural organism. The seasoned practitioner rarely underestimates the digestive power of his art. During the past years, activity in design and construction has not been high; but rarely has the profession shown greater activity in reappraising its art, in revaluing its constructive thought. I think we still carry on sanely the tradition of the past 4,000 years.

Dams and Hydraulics

J. L. SAVAGE
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THE DESIGN and construction of unprecedented government-financed projects have stimulated unusual advancements in engineering science and practice during the past year. This is particularly true in the field of dams and hydraulic construction. The Bureau of Reclamation, the Tennessee Valley Authority, the army engineers, the Metropolitan Water District of Southern California, and other organizations have brought about many noteworthy improvements in the art of designing and constructing dams and hydraulic works.

Concrete, earth and rockfill dams

Regional planning has been mentioned as the year's outstanding contribution to engineering science as some of the major dam projects approach completion. A classic example is the planning of a unified and coordinated system of dams to serve the entire Tennessee Valley for the threefold purpose of navigation, flood control and hydro-electric power. Each new dam is being planned not as an individual structure but as a unit in a comprehensive plan, so that the combined facilities for navigation, flood control and power will operate for the benefit of the valley as a whole. The Colorado River, Columbia River, Missouri River, and Muskingum River projects offer similar examples of broad scale regional planning.

Foundation investigations are becoming more dependable through the development of new tools and improved methods of exploration. The novel use of 36-in. core drills for exploration and inspection has furnished a convenient and economical means of viewing the undisturbed foundation rock in place. Ordinarily drilling is now quite generally done with 2⅛-in., instead of ⅞-in., drill equipment, and much better core recoveries are being obtained, particularly in weak rock zones. Improvements are also being made in the technique for the pressure-testing of drill holes and in the plotting and interpretation of pressure records. The economic value of thorough foundation explorations is more generally recognized, and the recently approved dam sites have been selected only after very comprehensive explorations. However, the most important advancement of the year in regard to foundation investigations is the increasing employment of experienced engineering geologists for foundation examinations and interpretations.

Foundation grouting is receiving intensive study, with the result that uplift pressure and foundation leaks are being reduced. This improvement is the result of greater care in fixing the spacing, location and depth of drill holes, in the better understanding of the correct water-cement ratios of the grout for varying conditions, and in the finer screening of the cement where necessitated by the closeness of the rock jointing. The foundation grouting methods developed at Norris Dam are especially noteworthy in that extensive clay seams have been completely washed out and grouted, thus obviating heavy excavations in rock.

Hydraulic-model testing has continued as a necessary method of design for spillways and outlet works to obtain the utmost in efficiency and economy. Relatively few, if any, major dam spillways have been designed during the past year without the careful checking of analytical designs by model tests. Such studies invariably result in improved design and usually effect savings in cost. The Metropolitan Water District of Southern California, in cooperation with the California Institute of Technology at Pasadena, has constructed a hydraulic testing laboratory where tests will be made on model pumps to check the design and efficiency of the unparalleled pumping equipment for the aqueduct. The Bureau of Reclamation has conducted many model tests in connection with the design of numerous earth dam and overflow concrete dam spillways; extensive studies have been made of the sluiceway and desilting features of Imperial Dam. Model tests of the diversion facilities during construction at Grand Coulee Dam are being carried on, and similar tests for Pickwick Dam are under way.

Stress analyses

Stress analyses by the trial-load method have continued to give the best results in designing concrete arch-gravity, and thin-arch dams. Some advances have been made in the method, whereby the proper sections are obtained in a shorter time. Photo-elastic laboratories have been installed and are of material advantage in checking stress distributions. Advances have been made in the manufacture of materials suitable for photo-elastic model tests. In analyzing stress conditions in straight gravity dams it has been found desirable to investigate loads carried by horizontal beam action and by twist action in both vertical and horizontal elements. Analytical studies, model investigations and field measurements have given a better understanding of shear stress distribution and shear-friction factors of safety along the foundations of concrete dams. Increasing the height of the Hetch Hetchy arch-gravity dam by 85.5 ft. has brought to the engineers of the city and county of San Francisco one of most difficult design problems of the year. After exhaustive stress analyses, a plan was adopted whereby the concrete of the enlarged dam, to be bonded to the downstream face of the present dam, will be formed to leave a wide open joint with elaborate provisions for shear keyways. This joint will be

backfilled with concrete after the new concrete in the downsteam enlargement has been artificially cooled; as an additional precaution, the new concrete will be bonded to the old with the aid of steel bars. In this manner the completed structure is designed to act monolithically.

Earthquake stresses have been considered in the stress analyses of major dams, even of dams located in regions where no disastrous earthquakes are known to have occurred. In the case of concrete gravity dams, the effects of vertical as well as horizontal earthquake accelerations are being investigated because of the changes in the factor of safety against sliding. Earthquake effects due to vertical accelerations are also being studied in connection with the design of earth dams.

Earth materials research has been greatly stimulated by the recent investigation, design and construction of numerous earth dams throughout the country. In the laboratory studies have been directed toward compaction, percolation, shear and other tests of the borrowpit and foundation materials taken from the vicinity of the dam sites.

Rockfill dams have received careful study from the design standpoint during the past year by the engineers of the Los Angeles County Flood Control District, who are responsible for the repair work on San Gabriel Dam No. 2 and the redesign of San Gabriel Dam No. 1. A distinct contribution has been made to the design of the rockfill type of dam wherein the usual inadequately supported concrete or granite face slab has been replaced by a relatively impervious earthfill.

Concrete manufacture and placement methods have continued to receive special attention. This is particularly true in the matter of heat control, as evidenced by the development and selection of special cements and the continued use of artificial cooling systems. More care has been taken in the design of concrete mixes, in the mixing operations, and in the conveying and placing of concrete to eliminate segregation and porosity. Mechanical vibrators of high frequency have been more extensively used for the compacting of both mass and reinforced concrete. Modified portland cement of the Norris Dam composition is being used at Grand Coulee Dam with provision for blending the cement from several different mills. Large quantities of low-heat cement of the Boulder Dam composition have been used by Army Engineers in the construction of locks on the upper Mississippi River. Puzzolan cement has been used by the Army at Bonneville Dam and in the New Orleans District. Extensive investigations of puzzolan cements are under way by the Bureau of Reclamation for possible use in Grand Coulee Dam.

THE INTAKE WORKS for the All-American Canal at Imperial Dam were designed with the aid of a model built to a scale ratio of 1:40. The model was built at the Bureau of Reclamation hydraulic laboratory at Montrose, Colo.

Construction equipment has never failed to keep pace with advance in the design of engineering works. The increased size of many present-day projects has brought forth new and efficient large-capacity equipment for mass production in the handling of earth and other materials. The large conveyor systems for handling excavation spoil, concrete aggregate and other materials at Grand Coulee Dam exemplify the strides made in the design of construction equipment. The designs of the concrete mixing and placing equipment on this project have shown marked improvement over those of earlier installations. Dragline excavators of special design and of unusually large size are being utilized by the contractor on the All-American Canal. Floating construction plant furnished the novel feature of construction of Wheeler Dam. At Pickwick Dam the embankment on one side of the river was constructed by hydraulic-dredge equipment utilizing material excavated from the site of the lock while that on the other side was constructed as a rolled embankment.

Power plants

The Wheeler turbine will discharge 11,000 sec.-ft. of water at full gate. It is the largest fixed-blade propeller turbine to be installed in this country. The outstanding feature is the extent to which models were used in designing the important hydraulic features. The shape and size of intake and design of trashracks and log fenders, the shape of the scroll-case interior, arrangement of baffles, the permissible upward slope of the floor of the horizontal draft tube, and the economic amount of tailrace excavation were investigated and determined by experiments on a homologous model. These tests were conducted in the hydraulic laboratory of the Bureau of Reclamation at Denver. Also the manufacturer's guarantees of horsepower and efficiency were based on laboratory tests of a 10-in. model having intake scroll case, draft tube and trashrack reproduced faithfully in every respect.

Adjustable-blade propeller turbines have undergone a recent development which consists of automatic correction of the blade angle of the propeller to the water supplied through the turbine wicket gate and without the use of oil pressure supplied from the governing system. Besides the utilization of the inherent operating force, this new turbine has the further advantage of being capable of quick response in following the turbine gate movements.

Plate-steel scroll-case design has been materially advanced through the utilization at the Norris plant of cast-steel sections at the scroll-case baffle, which eliminates formed plate work at this point and permits simple and positive connection of the scroll and penstock plate.

Steel penstock headers at the Boulder power plant are undergoing hydrostatic tests, and one of the 30-ft. headers has been successfully tested under an average pressure of 150 per cent of the operating head. These penstocks are unique in having no expansion joints. The pipe was installed under sufficient initial compression to compensate for temperature expansion. The initial stresses in the pipe under this operation were controlled by use of strain gages.

The Imperial Dam will be of the slab and buttress type on a sand foun-

dation with flexibly sealed joints between units. To reduce uplift, the foundation will be drained through inverted sand and gravel filters and ejectors.

The All-American Canal is approximately 80 miles long, and its upper end will have a capacity of 15,000 sec.-ft. The selection of a velocity which would not erode the banks but would keep the silt in suspension was given careful study, the value finally selected being 3.75 ft. per sec.

The desilting works at the head of the All-American Canal is a novel structure, consisting of three double basins designed for the removal of 60,000 tons of silt per day from the 12,000 sec.-ft. of diverted water. Each basin is provided with 24 rotating scrapers 125 ft. in diameter, which are to collect the deposited silt and feed the sludge pipes leading to the river channel.

Canal construction has been advanced by new methods developed by the Metropolitan Water District of Southern California. Automatic machines have been developed for trimming the bottom and slopes down to proper grade after rough excavation by dragline. This permits extreme precision in the finished subgrade and almost entirely eliminates overrun in concrete quantities. The concrete lining is poured in one operation from a large moving work-platform, which also constitutes a slip-form under which concrete is placed. The entire structure is supported by a steel truss carrier which runs on rails on opposite sides of the canal. A light structural-steel follower permits ready hand-troweling of the entire surface of the lining. The trimming, placing and finishing operations have been thoroughly standardized and are proving to be notably successful. A considerable advance has been made in the art of protecting freshly-poured concrete in desert areas. After considerable research, it has been determined that the most effective means of curing consists of two coats of coal-tar cutback sprayed on all exposed surfaces. What is believed to be the most extensive use ever made of large-diameter precast pipe is being undertaken in connection with the distribution system of the Los Angeles Water District. Contracts have already been awarded for 25.1 miles of precast concrete pipe having inside diameters of 10 ft. 3 in. to 12 ft. 8 in.

Sanitary Engineering

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THIS PAST YEAR witnessed considerable construction of sanitary engineering works as a direct result of federal assistance. Although much of the work could not have been undertaken without financial aid, it is encouraging to note that despite curtailed municipal budgets there is manifested a wide appreciation of the necessity for continuing with the improvement of sanitary facilities.

In this brief report of developments during 1935, progress in three major phases of activity—water, refuse and garbage collection and sewage disposal—have been broadly appraised.

Water treatment

Much construction in the waterworks field has been carried on with PWA funds. Under the second PWA program complete new waterworks are being provided for 415 communities, as compared with 719 communities thus benefited under the original PWA program.

At Milwaukee, construction work has been started on a water-purification plant of the rapid-sand filtration type. This treatment of water taken from Lake Michigan has been recommended for many years.

At the Chicago Experimental Filtration Plant, studies have continued with a view to eventual treatment of the city's entire water supply.

One of the most interesting developments in the waterworks field is the report of the committee of the New England Water Works Association on pipe-line friction coefficients, in which it is stated that the commonly accepted values of C in old unlined pipe are probably too high.

In water-treatment practice there is little that is outstanding. Interest continues in improvement of the physical qualities such as taste, odor and color, and in the control of the corrosive quality. The use of activated carbon is increasing in popularity. Continued attention is directed toward a satisfactory solution of red water troubles.

The interest of the federal government in stream pollution has been crystallized in the report to the National Resources Committee by the Special Advisory Committee on Water Pollution, in which the interesting recommendation is made that a demonstration river conservancy district be set up covering the Potomac River.

Refuse and garbage

There is little that is new in the field of refuse collection, although from time to time a few additional cities adopt metal-enclosed collection vehicles, designed to avoid dissemination of dust and odor and to conceal the contents from view. In Europe the most interesting development lies in the orders reported to have been given by the governments of Italy and Germany to the cities to buy only those collecting vehicles which are propelled by engines burning gases. Engines have been designed to use compressed methane and propane and wood- or charcoal-gas distilled in a retort on the vehicle itself.

For garbage disposal there can be no doubt that hog feeding is still the method most commonly used, in spite of the well-known fact that this is not a method of disposal but one of partial reduction in volume and of change to a much more offensive substance—pig manure, bedding and uneaten garbage—which weighs from ⅓ to ½ as much as the original material. The continuing high pork prices are a boon to hog raisers.

There continues to be considerable interest on the Pacific Coast in filling waste land with refuse and then covering it with earth or ashes, but this enthusiasm does not appear to extend to the eastern part of the country.

A few incinerators have been built and are under construction with federal financial aid, twelve in the first PWA program and twelve in the second program, while many others are contemplated. There is more interest in utilization of heat, as at New York and Providence, where it will be converted into electrical energy, and at Rochester, N. Y., where it will be used in the form of superheated steam.

One new garbage-reduction plant has been built in Philadelphia, adjacent to the incinerator. Here the process is somewhat abbreviated and the tankage, while still fairly moist, is burned in the incinerator. At the Syracuse incinerator considerable success is reported with partial drying by direct heat and extraction in a new type of drier.

While the grinding of garbage and its discharge into the Mississippi River is said to be giving satisfactory disposal at St. Louis, there are few cities so favorably situated as to be able to utilize this method.

The possibilities of grinding garbage and disposing of it with sewage are being carefully considered. This scheme has been used during several months' shutdown of the Indianapolis reduction plant and as a means of lightening the summer peak load on the incinerator at Baltimore. There is popular interest in household garbage grinders. At present prices, however, they will not be a disturbing factor to operators of city sewage or garbage works.

In England and France the greatest interest is in "controlled tipping." This is similar to the filling and covering process used on the Pacific Coast, but a different type of refuse is dealt with. In Holland incineration appears to be gaining in popularity. Italy has a number of ingenious biological processes, including one in which mixed refuse is ground into small pieces and subse-

quently used on the land as a lightening and warming agent for heavy soils in cold weather.

Sewage treatment

The outstanding feature of development within the sewage field is the large number of sewage-disposal works, building or in immediate prospect, for which the federal government has given financial aid. In the second PWA program there were 198 such plants compared with 291 in the first program. While most of these are relatively small, it is noteworthy that a number of large cities are at last falling into line—for example, Washington, D. C., San Francisco, Buffalo, Detroit, and others are actively proceeding, while Chicago is continuing its long-time program.

Consideration is being given to many new features of sewage treatment, particularly in the use of additional mechanical equipment. More interest is shown in grinding screenings, following which they are returned to the sewage flow. Preliminary treatment is being provided in some cases for removal of grease either ahead of or in the sedimentation tanks. The newer methods of grit handling and the mechanical cleaning of racks are increasing in popularity.

Chemical precipitation is receiving considerable attention. In this field many patents have been issued, and about a dozen processes are being or have been promoted. Some of these are new, and some are similar to those of 40 years ago. In some places where seasonal improvement of treatment in hot dry weather or the bathing season is required, chemical treatment has been adopted. A notable example is the new Coney Island plant of New York City. Most of the chemical processes provide a degree of purification intermediate between plain sedimentation and oxidation.

Sludge disposal still stands in first rank as the most troublesome problem of sewage treatment. There are still important problems to be solved in connection with many of the existing separate sludge-digestion plants, although much information is being published continuously on this subject.

Disposal of sludge by incineration is attracting much interest, but so far the work has been limited to the plant at Dearborn and the experimental work at Chicago. At the latter place incineration has been approved for the new Calumet works, and that plant is now under construction. It is also proposed for the new Southwest Side works.

Increased interest is being shown in the utilization of energy from sludge gas, not only for operating gas engines, but also in the recovery through heat exchangers of the heat in the exhaust gases and in the cooling water of the engines. Recovery of heat from burning sludge and its utilization for drying sludge, preheating air for combustion, building heating, or as power, are receiving some attention. These are the principal developments in utilization of byproducts from sewage treatment.

While sewage sludge is to be used at Washington for enriching sandy soil at the city's farm and while sludge is perhaps in a more favorable market position compared with the cost of other fertilizer, due to low farm income and labor cost, there appear to be no new developments in recovery of fertilizing ingredients in sludge.

Civil Engineering Research

M. O. WITHEY

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DURING 1935, civil engineering research was of high caliber, although in number of reports perhaps somewhat less than in 1934. Statistics from the Association of Land Grant Colleges show that there was a small decrease in appropriations to Engineering Experiment Stations, but despite such curtailment there was an increase in publications, number of persons employed and projects in progress in these stations.

In highway engineering an outstanding contribution to the betterment of structural design of concrete pavements is the scientific test program of the Bureau of Public Roads on the Arlington experimental road. From these tests and observations there will be obtained a more precise knowledge of the effects of loads, the relative efficiency of typical pavement designs, the effectiveness of various types of joints, and the influence of temperature and of moisture conditions on dimensions, form and strength of pavement slabs.

Judging by the tests of road gravel and crushed rock thus far made in the Los Angeles rattler, it appears that results obtained from this machine coordinate better with service records and are less affected by size of sample and dust than do the results from the Deval abrasion test. The new rattler appears to be an excellent determinator of quality of such aggregates.

The past year also witnessed experiments to ascertain the durability of bituminous materials used in construction and maintenance and studies on the proper percentage of asphalt or tar required in coarse-graded bituminous mixes as well as the stability of aggregate in such mixes. Progress has also been made in the development of stability and impact tests of bituminous paving mixtures.

Hydraulic and sanitary engineering

A marked increase in the use of models in the design of dams, spillways and power projects is noted. The largest model, 325 ft. long, represents a five-mile stretch of the Columbia River adjacent to the Bonneville Dam site. Other examples are additional tests on the Boulder Dam spillway model, model research on proper type of profile for spillway crests at Massachusetts Institute of Technology, and studies of stresses in laminated dam models of rubber and of plaster by the Bureau of Reclamation. At Iowa University the Army Engineers have made a large number of tests of models of locks and dams to be installed on the Mississippi and Tennessee Rivers.

Studies of efficiencies of various types of structures for controlling the formation of gullies and methods and costs of terracing slopes were undertaken both at Iowa State College and at the University of Wisconsin. From the West Virginia highway department came a valuable survey of the condition of 4,000 culverts; the ratings thus obtained furnish evidence of the deterioration caused by acid waters. Data on the influence of depth of fill and the effects of slope of the culvert are also reported.

Reports coming from the University of Wisconsin on the oxygen demand of activated sludge, from the Illinois water survey on rapid methods of determining the oxygen absorption of sewage by the Nordell odeometer, from Harvard on the development and use of the osmoscope for measuring the intensities of odors, are significant additions to sanitary engineering technique.

Materials

A more intelligent use of portland-puzzolan cements is assured by the comprehensive and informative report on their properties from the University of California. A most thorough study of the permeability of mass concrete by the Bureau of Reclamation demonstrates that the flow of water through concrete follows Darcy's law of viscous flow and supplies new data on the effects of high pressures and the characteristics of the concrete on the rate of percolation.

Extensive durability tests on concretes made with cements of different compositions conducted at Lehigh University, and other tests at the Bureau of Standards, furnish useful data on the range in resistance to freezing and thawing of ordinary portland and high-early-strength cements. From the laboratory of the Portland Cement Association came an instructive résumé of the markedly beneficial results obtained by curing concrete blocks under high-pressure steam and detailed information on the water retained by cement pastes when hardened and dried under various conditions.

Knowledge of the mechanics of plastic flow of concrete has been increased by the development of Shank's equation from

studies made at Ohio State University and by the data on the effect of time yield on the stresses in a full-size reinforced-concrete arch bridge at the University of Illinois.

The year has marked a notable advance in the study of high-frequency vibration for placing concrete. The properties of concrete placed by vibration were investigated at many of the Mississippi River lock-and-dam projects, at the Ohio highway laboratory, the Bureau of Public Roads, and Minnesota and Wisconsin Universities. Information on the effectiveness of different frequencies was secured at the latter institution.

For the user of wood, two recent publications of the results of long research at the Forest Products Laboratory brought out data of great value. These were "The Wood Handbook" and a bulletin on "Strength and Related Properties of Woods of the United States."

Soils and soil mechanics

Relatively inexpensive and very effective means for locating subsurface aggregate deposits based on earth resistivity and seismic methods have recently been investigated at the Bureau of Public Roads. The resistivity method appears best suited to locating gravel deposits, whereas the seismic method seems to be more reliable in locating solid rock.

Reports on ice-pressure determinations in clay soils and shear tests on soils from Harvard, on the harmful effects of certain soil solutions on concrete pavement slabs from the Bureau of Public Roads, and a bulletin from the University of Illinois describing simplified methods of computing vertical pressures in elastic foundations, all contribute to a better understanding of soil science.

Structural engineering

A progress report from the University of Illinois on a searching investigation into the causes of rail failures has shown that rail fissures are due in many cases to stresses under heavy wheel-loads on shatter-cracked rails. It is heartening to learn that such dangerous conditions may be largely eliminated by thermal treatment of the rails after rolling (to prevent the development of shatter-cracks) and by careful attention to maintenance of rolling stock and track. From the same institution tests were reported on 35 monolithic concrete walls in which resistances to axial, eccentric and fluxural loads were determined.

Information on the torsional strength of structural-steel beams has been revealed by recent tests at Lehigh University. Work at the College of the City of New York showed the comparative rigidity of eighteen riveted connections.

Among the novel methods of checking designs which have been developed within the year are: the weighing of bridge reactions by the use of proving rings at the Little Bay and Cape Cod Canal bridges; the use of plaster models to predict the strength of structures and parts which cannot be investigated analytically, as described in a bulletin from the University of Wisconsin similar determinations of stress concentrations at fillets, holes and keyways, reported in a recent Illinois bulletin; the use of a centrifuge to increase the gravity load on a test model; and the determination of stresses in such models by stroboscope and photo-elastic methods at Columbia University.

Cement and Concrete

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DISCUSSION of changes in specifications for portland cement characterized 1935 in noteworthy degree. Its origin dates back several years, or perhaps to the time the United States Bureau of Reclamation specified a low-heat cement for Boulder Dam.

Until one attempts to compile the different specifications which are now in use, the situation is decidedly confusing, but when the principal cement specifications proposed during the past two or three years are placed side by side and carefully scrutinized, as may be done by a study of the table herewith, it will be seen that while there has been a departure from the 1930 specifications of the American Society for Testing Materials, the general trend is in a common direction. There is a tendency to add chemical restrictions and to specify fineness by specific surface (determined by turbidimeter or similar apparatus).

Revisions in federal specifications have been proposed for five different types of cement, but they are not included in the tabulation, due to the fact that further consideration is to be given by the manufacturers and the sponsoring committees. These proposed specifications include chemical limitations, in addition to those shown in the table. They also propose to eliminate compound compositions. For moderate-heat and low-heat cement cumulative heat of hydration is specified.

Soundness and time of setting requirements are practically identical in all of the specifications. Some of the specifications retain the briquet tension test, whereas others are requiring a compression test. In general, those using the briquet test continue to use standard Ottawa sand, but for compression tests the tendency is to require the so-called graded Ottawa sand and plastic mortar. One purchaser is specifying a concrete strength, which is perhaps the most radical departure of all.

Evidently the standard specifications of the A.S.T.M. as now written will not satisfy those large consumers who are purchasing cement under their individual specifications or propose to do so. But it will also be seen that, with the proper spirit of cooperation among the consumers, it should not be a great problem to reconcile these specifications and group them into separate classes. Doubtless one of these would be a high-early-strength cement, and another would be a regular cement for the general retail market; in addition there will remain a demand for a cement having a moderate heat of hydration, which cement might at the same time be sufficiently sulfate-resistant to satisfy the demands of the consumers faced with the problem of sulfate waters.

To summarize the situation with reference to cement: The present standard specification of the A.S.T.M. does not fully meet the requirements of the consumers who are using cement in large quantities for the construction of dams, and in some cases for the construction of highways and bridges. There is a demand for a moderate-heat cement specification, which might be a compromise of those shown in the table. There will, of course, be continued demand for regular portland cement (with perhaps slight modifications) and for high-early-strength cement, with a possible demand for a sulfate-resistant cement for severe conditons.

It is necessary to note also the attention given during the past year to the use of puzzolanic and other materials in combination with portland cement, either to increase the workability of the concrete or to decrease the heat of hydration and the effects of shrinkage in large masses of concrete. Some of this may be due to the fact that no changes have been made in the standard cement specifications of the A.S.T.M. for a period of years; some to the activity of concrete technicians in the development of better concrete by improved grading and proportioning of the materials.

Better concrete practice

In concrete construction there is a strongly continuing trend toward close control in proportioning and methods of placing. A few years ago it was somewhat of a novelty to separate the coarse aggregate into various sizes; today it is standard practice. In addition, fine aggregate is being separated into two or three sizes. Classifiers have been developed which make it possible to produce fine aggregate with accuracy and economy between such sieve sizes as 20, 48 and 100 mesh.

The use of vibration in placing concrete has also made progress. It has made possible the use of dry mixes of very low cemest content but of remarkably uniform compressive strength.

SPECIFICATIONS FOR PORTLAND CEMENT—CURRENT AND PROPOSED

Chemical and Physical Properties	A.S.T.M.				RECLAMATION BUREAU				T.V.A.	CORPS OF ENGINEERS				HIGHWAY			
	C9-30	C74-30T H.E.S.	Proposed Tentative Sulf. Res.	Proposed Tentative Low Heat	Boulder Dam Low Heat	Grand Coulee Dam	All American Canal System Type A	All American Canal System Type B Sulf. Res.	Type B	Standard Specification	Fort Peck Dam	Tygart River Dam	Bonneville Dam	New York	New Jersey	Tri-Borough Bridge Sulf. Res.	Colo. River Aqueduct
Date Adopted	1930	1930			4-10-34	7-22-35	10-22-35	10-22-35	Sept. '34	7-1-35	4-10-34	1-7-35	May 1935				
Chem. Comp., Per Cent (max.)																	
Loss on ignition	4.00	4.00	4.00	4.00	3.00	2.00	2.00	2.00	3.00	4.00	2.50	3.00	3.00	4.00	4.00	2.00	2.00+.25
Insoluble residue	0.85	0.85	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.65	0.85		0.85	0.85	0.80	0.85+.15
Sulfuric anhydride (SO_3)	2.00	2.50	2.00	2.00	2.00	2.00	2.25	2.25	2.00	2.00	1.75	2.00	2.00	2.00	2.00	2.00	2.00+.10
Magnesia (MgO)	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	4.00	5.00+.40
Alumina (Al_2O_3)											6.50						
Ratio Fe_2O_3 to Al_2O_3			1.56	1.56	1.50		1.50	1.50	1.50		.50-1.56					0.53-1.56	
Ratio Al_2O_3 to Fe_2O_3											.64-2.00						
Silica (SiO_2), min											21.00						
Compound Comp.—Max. Per Cent																	
Tricalcium silicate (C_3S)			[b]55	[c]	40	35-55	35-55	35-50	35-55	55		35-50		55			55
Dicalcium silicate (C_2S)					65												
Tricalcium aluminate (C_3A)			8	7	7	7	8	5	8	8		8		9		8	8
Tetracalcium alumino ferrite (C_4AF)					20												
Sum of (C_3A and C_4AF)								12									
Fineness																	
Residue on Sieves—Max. Wgt. Per Cent																	
200-mesh sieve[a]	22	22								22	10			16	22		
Spec. Surf.—Sq. Cm. Per Gr.																	
Turbidimeter units—not more than					2300		2300	2300	2200			2200					2200
Turbidimeter units not less than			1500	1500	1700	1800	1700	1700	1600			1600				1500	1800
Equiv. microneter units not more than					1800												1830
Equiv. microneter units not less than					1400												1570
Hydrometer units not less than													1800				
Soundness—After 5 hr. over boiling water	Pat shall remain firm, hard and show no signs of distortion, cracking, checking or disintegration																
Soundness—After 28-day sod. sulf. test			Req.				Req.	42-day Req.			Req.					Req.	
Time of Setting																	
Initial: Vicat—min., not less than	45	45								45	45	45		45	45		
Gillmore—min., not less than	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Final: Vicat—hr., not more than	10	10								10	10	10		10	10		
Gillmore—hr., not more than	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Tens. Strength Lb. Per Sq. In., Min.																	
1 to 3 Standard Ottawa Sand Mortar — 1-day		275															
1 to 3 Standard Ottawa Sand Mortar — 3-day		375															
1 to 3 Standard Ottawa Sand Mortar — 7-day	275			[d]150						250	[e]275		275	275	275		275
1 to 3 Standard Ottawa Sand Mortar — 28-day	350	Above 3-day		275						325	350		[f]350	350	375		[f]350
Comp. Strength, Lb. Per Sq. In. Min.																	
1 to 3 2x4-in. cyl. Stand. Ottawa Sand Mortar — 7-day					1000												
1 to 3 2x4-in. cyl. Stand. Ottawa Sand Mortar — 28-day					2000												
Min. Per Cent Increase, 7 to 28-day					35												
2-in. cubes of 1:2.77 Ottawa Sand Mortar — 3-day			750	[d]500					750			750				750	
2-in. cubes of 1:2.77 Ottawa Sand Mortar — 7-day			1500	1500		1500	1500	1500	1500			1500				1500	
2-in. cubes of 1:2.77 Ottawa Sand Mortar — 28-day			2500	Above 7-day		2500	2500	2500	2500			2500				2500	
Min. Per Cent Increase: 7 to 28-day						25	20	20									
6x12-in. Concrete Cylinders: 7-day																	
28-day Lab.)														[g]4750			
28-day (Field)														[h]5000			
Cum. Heat of Hyd.—Cal. Per Gram																	
By heat of sol. method: 7-day, not more than					65												
By heat of sol. method: 28-day, not more than					75												

[a]—For Bonneville cement 12 per cent max. on 325-mesh sieve.
[b]—This limit applies only when moderate heat cement is desired.
[c]—Sum of percentages of tricalcium silicate plus two times percentage of tricalcium aluminate shall not exceed 50.
[d]—Tensile briquet test permitted in lieu of compression test of 2-in. plastic mortar cube when no compression machine is available.
[e]—Also strength of neat cement briquets—1-day 200 lb. per sq.in., 7-day 500, 28-day 600
[f]—Also shall be higher than 7-day.
[g]—Mixture: 1-1.7 (quartz sand)—3 (trap rock) by volume, w/c 4.65 gal. per sack.
[h]—Mixture: 1-1.75—3.50 by volume for void content in coarse aggregate of 45%

In considering the steady progress in concrete quality of the last few years, the part played by the manufacturers of equipment for batching, mixing and placing concrete may not be overlooked. As a result of their developments it is now possible for a central plant to mix and handle several thousand yards of concrete per day over a long period of time with accurate control and unusual freedom from breakdowns. This improvement of equipment not only makes quality concrete possible but also permits more accurate predetermination of costs.

City and State Planning

JACOB CRANE
President, American City Planning Institute

WHEN the mayor and council of a city discover that they need an arm of the municipal government to study the city's physical development as a whole and to recommend policies and programs bearing thereon, and when a department or board with a staff is established for this purpose, then that municipality has undertaken city planning. The present situation with state planning is such that no single specific definition can be given at this time. The best we can say is that state governments are experimenting variously with a new agency, generally called state planning boards, the function of which is to aid the state administration at one or more points in the formulation of the state government's policies and programs. The work of these boards ranges from that of almost purely academic research to concentration upon the single topic of public-works programming. When state planning steadies down, it may not constitute a strict counterpart of city planning.

The astonishing thing about state planning is the rapidity of its spread during the past two years. In November, 1933, there was not a single active state planning agency in the country. By November, 1935, every state except Louisiana had organized some form of planning board. Rarely before has a relatively new idea in government taken hold so precipitately. A combination of circumstances gave great impetus to the movement during this two-year period. Franklin D. Roosevelt in several addresses and in his book "Looking Forward" pointed out the wisdom of state-wide planning for reforestation, power, recreation and other matters. The National Planning Board (succeeded by the present National Resources Committee), whose primary responsibility was to assist the PWA in the programming of public works, attached great importance to the desirability of state planning for public works, and it offered to provide temporary consultant services to state planning boards, and also to assist them in securing work-relief funds for staff purposes, pending the appropriation of state funds. By virtue of a sequence of events some state administrations believed that their sponsorship of state planning would facilitate the flow of relief and public-works funds into their states, and particularly that it would aid in decentralizing control from a federal to a state basis. Of course in many states there had been some background of state-wide planning (in connection with highways, recreation, conservation, etc.), and the governors and legislators had an inkling of the general idea. However, with few exceptions, the motivation in this intense state planning activity was derived more from immediate than from long-range considerations. It remains to be seen how many state planning agencies (by whatever names) become recognized and utilized arms of state government, fitted into a working relationship with legislative departments and capable of actually aiding in the formulation of state policies.

The state planning boards necessarily deal with many engineering matters. Particularly they have concerned themselves with the programming of public works and relief works. For the first time many states have cataloged their needs for physical development projects which fall within the jurisdiction of the federal government, the states, the towns and counties, the cities and the special local agencies such as sanitary and park districts.

City planning

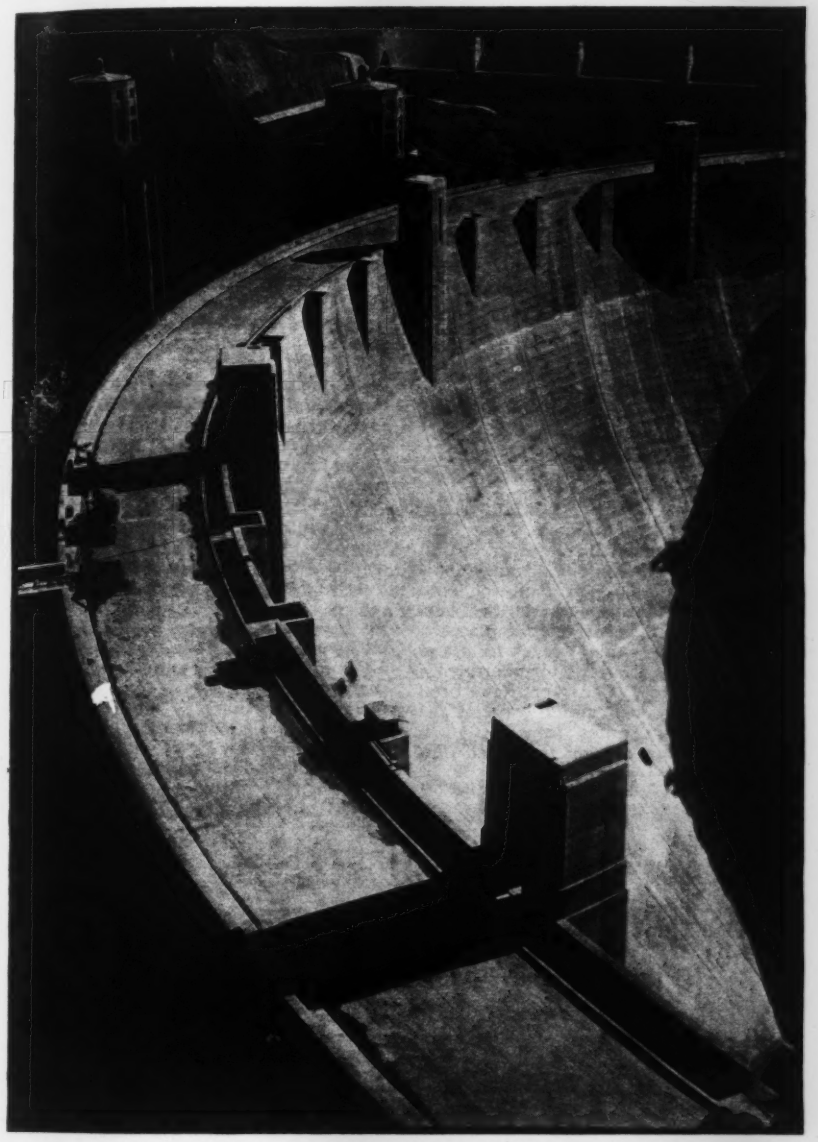
During the depression period and coincident with the development of state planning boards, city planning activity generally receded. Curtailment of municipal budgets left many city planning commissions more or less stranded. The lack of real estate development and of public works financed through purely local action led city administrations to believe that city planning was less necessary than it had been considered during the decade following the World War. The entire city planning movement appeared to be threatened. More recently, however, our city governments have begun to realize that public-works programs, sound municipal fiscal programs and housing programs must be based upon careful and board city planning. Accordingly, a good many cities have reinstituted or newly instituted their planning work. New types of surveys have been made, particularly housing and zoning surveys. Public-works programs and fiscal programs have been prepared and revised. City planning is coming back. It is particularly important to note that all agencies of government, federal, state and local, are beginning to realize that our state and national policies and programs must have their origin in the local scene, and that city and county planning is essential to the rational and efficient use of our resources and our man power. While there is visible a definite trend toward planning for state and nation-wide units, there is also under way an equally important trend toward the strengthening and intensification of local planning.

With the rapid expansion of planning at the state and national level, and with our increasing comprehension of the inevitable relationship between the activities of government at the several levels, local, state and national, we find ourselves faced with a major problem in the matter of providing systematic procedures for the coordination of planning. To obviate costly blind spots in our policies and programs, everything possible must be done toward the coordination of federal, state and local plans into a relatively unified whole. We cannot afford to have the federal program for navigation, the state program for highways and bridges, and the local program for water supply and sewage disposal operating at cross-purposes—past experience has shown that the three levels of government do sometimes conflict and thus cause dissatisfaction and waste. State planning boards should facilitate coordination within the states, and some are so doing. These boards may also be the logical agencies to facilitate the adjustment of federal to state and local enterprises, especially those more strictly intrastate in character.

A great many of our most important development enterprises are definitely interstate in their geography and in their significance. This is true of inland waterways, of major reforestation, of major land-use adjustments, of major highways, of electric power, and so on. Both the federal and the state governments are vitally concerned, not only in the individual project but in the composite of these enterprises and the development of the program as a whole. A new arrangement on an interstate regional basis is emerging to handle this problem. In New England and in the Pacific Northwest, interstate regional planning commissions have been organized with representation from the several state planning boards and from the National Resources Committee.

All told, there has been a great increase during the past year or two in the various activities falling under the head of planning. Much of it has to do with advance planning, programming and coordination of engineering works. Virtually every man with training and experience in the planning field is now engaged in one capacity or another, and there is an urgent demand for additional trained experienced men. Many engineering schools are overlooking an opportunity here, both in the classroom phase and in the apprentice phase of preparing students for city and state planning work.

PROGRESS ON LARGE PROJECTS



BOULDER DAM was dedicated on Sept. 30, more than two years before the scheduled completion date. This picture shows the completed roadway on the dam looking toward the Arizona spillway.

Water Supply . . .

✦ **Colorado River Aqueduct**—On the $220,000,000 Colorado River Aqueduct of the Metropolitan Water District of Southern California construction has been actively under way all year along its 300-mile length. At the end of the year only about 9 miles of tunnel remained to be driven in a total of 92 miles. Most of the mileage of tunnel yet to be driven is in the San Jacinto Tunnel (total length 12½ miles), which is the most difficult feature of the entire job by reason of water inflow. Lining in the 92 miles of tunnels is about one-third done. In canal, conduit and siphon sections excavation was more than half done with concreting about one-third done.

✦ **Parker Dam**—Work on Parker Dam, the diversion dam in the Colorado River which the U. S. Bureau of Reclamation is building for the Metropolitan Water District of Southern California, was shut down 6½ months during 1935 pending authorization of the project by Congress. Following authorization, work was resumed on the twin diversion tunnels, 32 ft. in diameter, which are being driven around the dam site on the Arizona side.

✦ **Mono Basin Project**—The 11.3-mile Mono Craters Tunnel (9 ft. wide), to supplement the water supply feeding the Owens Valley Aqueduct that serves Los Angeles, now is advancing from four headings, i.e., two portals and two headings from an access shaft. One-third of the total length has been driven. A second shaft, to be 900 ft. deep, is still under construction. During the 3½-year period allotted to tunnel-driving, Grant Lake Dam and Long Valley Dam, an earthfill and a rockfill structure, respectively, are to be built. The Mono project will cost about $7,600,000 exclusive of water rights and lands.

✦ **Raising O'Shaughnessy Dam**—O'Shaughnessy Dam, of San Francisco's Hetch Hetchy water system, is being raised 85 ft., making the total height 430 ft. and increasing the storage from 206,000 to 360,000 acre-ft. Placing concrete will start early in 1936.

✦ **Transmountain Water for Denver**—Work on the Moffat water tunnel project for Denver, Colo., was prosecuted vigorously during 1935 following approval of PWA funds. Enlargement of the tunnel from the inlet shaft to the apex of the tunnel was completed in October. Intake shaft and structures for the west and east portals are ready for water. Concreting of the tunnel is scheduled for completion in May of this year. Work on the South Boulder diversion dam, canalization of the creek, siphons, tunnels, flumes and canals is scheduled for completion during the early spring. Contract on the west side for the collection ditches on Fraser and Jim creeks with diversion dams and siphons has been essentially completed.

✦ **Fort Smith Waterworks**—An entirely new source of water supply for Fort Smith, Ark., costing $1,500,000 and involving 1,000,000 cu.yd. of earth and rock dam, an 8-m.g.d. filter plant, a 23-mile, 27-in. welded steel pipe line, is about three-fourths completed and will be placed in operation this spring. The steel pipe line is 50 per cent laid and the dam is 75 per cent done. Filter equipment is yet to be installed.

✦ **Milwaukee Water-Purification Plant**—A 750,000-gal. concrete washwater tank, the first major structure of Milwaukee's water-purification plant, has been completed and tested, and the 60-in. steel mains from the tank and from the lake to the filter plant have been laid. On a 24-acre site enclosed in steel sheet-piles and extending 750 ft. into the lake two coagulation basins, 297x372 ft. in

BONNEVILLE DAM on the Columbia River. At the left is the irrigation lock and the intake structure of the power house, both in the south river channel, and in the north channel the main dam is rising within the cofferdam.

plan, and two of three filtered-water basins were built last year. Contracts for filters and underlying clear wells are one-third completed. Contracts have been awarded for motor-driven centrifugal pumps and bids called for filter equipment.

✦ **Springfield (Ill.) Filters**—The water-purification plant for Springfield, Ill., the last unit of a $5,640,000 program of waterworks extensions, is about half complete. Involved is a 21.4-billion-gal. lake costing $2,600,000, two dams, two bridges and a $1,125,000 pumping station and power plant.

✦ **Chicago Water Works**—The 12-mile $13,000,000 Chicago Ave. water-supply tunnel and Dever crib were completed and put in service on Dec. 20. The new $2,250,000 Cermak pumping station is practically complete as are the tunnel connections. A novel chlorination plant at the Dunne and 68th St. twin cribs is complete except for minor adjustments.

✦ **Rehabilitating Cincinnati Filter Plant**—A model of its kind when completed 30 years ago, the Cincinnati water-purification plant is about to be rehabilitated at a cost of $3,120,000. Contracts were let late in the year for two-thirds of the work.

✦ **New York Water Tunnel**—The 20-mile Tunnel No. 2 of the New York water supply system extending from Hillview Reservoir in the Bronx under the East River to Queens and Brooklyn was given its final inspection early in January, 1936, preparatory to putting it into service.

✦ **Quabbin Reservoir**—Several elements of the new Quabbin Reservoir project for Boston metropolitan water supply were under active construction last year. The 24½-mile aqueduct tunnel leading from the proposed reservoir to the old Wachusetts reservoir and distribution system is now complete. The hydraulic-fill Quabbin dike, one of the two large earth dams on the project, was about 25 per cent complete at the end of the year. At the Swift River site of the main dam 37 pneumatic caissons were sunk across the valley floor to serve as a cutoff wall for the dam, contract for which is expected to be let this year.

Sewage Treatment . . .

✦ **White Point Sewer Outfall**—After several years of preliminary work construction has started on a sewer outfall project of the Los Angeles County sanitation districts. This project, to serve Los Angeles County communities outside incorporated areas, contemplates a tunnel under the Palos Verdes hills and a mile-long ocean outfall terminating in water 110 ft. deep. Contracts have been let and work is well under way on the tunnel (about 6 miles long) of 8-ft. horseshoe section and on the ocean outfall sewer.

✦ **Denver Sewage Treatment**—A 54-m.g.d. sewage treatment plant for Denver, Colo., has been financed by bonds and a PWA grant. Construction contract has been awarded for clearing and grading. The plant will provide for primary treatment and separate sludge digestion. Contracts for equipment have been awarded and plans for structures are in preparation.

✦ **Minneapolis-St. Paul Sewage Disposal**—The $15,300,000 project of the Minneapolis-St. Paul Sanitary District now has 33 major contracts completed or under construction, 17 by the district, 9 by St. Paul and 7 by Minneapolis. Some 60 per cent of a 50,000-ft. sewer (7½ miles in tunnel) is complete and 88 per cent under contract. Type of treatment, recently decided on, will include screen and grit chambers, mixing and flocculation tanks, settling tanks (possibly filtration) and sludge disposal by vacuum filtration and incineration. Screen and grit chambers are under construction, the remaining units will go under contract this spring with completion scheduled for early in 1937.

✦ **Sanitary District of Chicago**—During 1935 the Sanitary District of Chicago completed construction costing $11,214,000 on its treatment program. Total expenditure to date on the program is $119,000,000. Under way now are contracts for $10,735,000 and designs for $26,000,000, leaving work estimated at $44,374,000 to be done. Last year's work included completion of 36 Imhoff tanks at the West Side plant, the Calumet works, 21 miles of interceptors and rehabilitation of the Lockport power house. New work included initial contracts for the Southwest plant and interceptor, Upper Des Plaines interceptor and Calumet Sludge incinerator. New work in 1936 involves 53 miles of interceptors, twelve settling tanks at North Side and Chicago River control works.

✦ **Cleveland**—During the year steady construction progress was made on the 123-m.g.d. easterly activated sludge plant at Cleveland, Ohio. This $12,000,000 PWA project is now 75 per cent completed.

✦ **Columbus**—Construction has advanced beyond the halfway mark on the 15-m.g.d. activated sludge plant costing $3,400,000 at Columbus, Ohio, which is being built to replace an existing overloaded Imhoff tank and sprinkling filter installation. Improved sewerage facilities throughout the city, including a 10-mile intercepting sewer, have been constructed at a cost of $6,000,000.

✦ **Niagara Falls**—Work has started on a partial treatment plant at Niagara Falls, N. Y., costing $1,380,000 and on intercepting sewers estimated to cost $800,000.

✦ **Buffalo** — After bickering several months over the selection of an engineer to design and supervise the construction of its $15,000,000 sewage plant and intercepting sewer system, the Buffalo Sewer Authority finally got its program under way on Dec. 14 when it awarded storm drain contracts.

✦ **Atlanta**—Seven new sewage treatment plants will be constructed at Atlanta, Ga., and one of three existing plants will be enlarged, in the $6,000,000 sanitary improvement program now under way for the Atlanta district.

✦ **Washington**—The 130-m.g.d. partial treatment plant designed to treat the sewage flow from a tributary population of 650,000 at Washington, D. C., is well advanced in construction. The grit chambers and grease separators preced-

ing twelve mechanically-cleaned circular sedimentation units as well as the eight sludge digestion tanks have been completed.

✦ **New York City**—Marked progress was made during the year toward realization of a comprehensive plan of sewage disposal for the entire city of New York, which will ultimately include 38 plants for treating 1,765 m.g.d. The first plant to be completed was the 35-m.g.d. unit at Coney Island. It was placed into operation on July 1. The 180-m.g.d. Ward's Island activated sludge plant, on which $5,500,000 had previously been spent for the construction of aeration, preliminary, and final tanks, was assured of rapid completion when a $25,245,000 PWA loan and grant was awarded last August. Intercepting sewers, grit chambers, and tunnels are already under contract. Designs are now being made for the 40-m.g.d. Tallman's Island plant and the 65-m.g.d. Jamaica plant.

Flood Control . . .

✦ **San Gabriel Dams Nos. 1 and 2**—On dam No. 2 of the Los Angeles County Flood Control District, an upstream facing of timber and a considerable volume of rockfill have been added as part of the new management's program to make this an effective flood-control unit. At Dam No. 1 work was shut down for more than half the year during debate over changes in design. Revised plans approved by the state engineer in August permitted resumption of work on a dam to have flatter slopes, and the use of material from the adjacent quarry, which previously has been rejected.

✦ **Los Angeles County Flood Control**—Independent of the work in San Gabriel Canyon, flood-control work in Los Angeles County under the direction of the U. S. Engineer Department has been expending an allotment of $14,000,000 for clearing flood channels or building débris basins, concrete-lined channels, bank protection and other structures on which the percentage of labor cost is high.

✦ **Lower Rio Grande Flood Control**—Expenditure of $1,800,000 of PWA funds on the control of floods in the Lower Rio Grande was completed in 1935 by the American section of the International Boundary Commission, and an equal sum was asked for from the present Congress. There are 158 miles of floodway and 195 miles of floodway levees in the project aside from 88 miles of levees along the river.

✦ **Rio Grande Rectification**—Elimination of the flood hazard and stabilization of the Mexican Boundary line is the aim of the Rio Grande rectification program in the El Paso-Juarez Valley. According to the convention of 1933, Mexico was to build 39 miles of levee and the United States the remainder of the project, including 86 miles of river channel, 123 miles of levee, certain bridges and grade-control structures and Caballo Dam for flood control, noted elsewhere. To date, the United States has completed 48 miles of levees and 35 miles of river channel, involving 4,000,000 cu.yd. of earthwork; Mexico 14 miles of levee and 1,000,000 cu.yd. of earthwork.

✦ **Caballo Dam**—The original allotment of $1,500,000 to the Department of State, supplemented by $1,000,000, has been transferred to the Bureau of Reclamation for the construction of a high dam at the Caballo site, about 20 miles below Elephant Butte Dam on the Rio Grande, with the provision that 100,000 acre-ft. be retained in the reservoir for flood-control purposes. Plans and specifications for the dam and appurtenant works are nearing completion, and the advertisement for the work will be issued at an early date.

✦ **Conchas Dam** — Located in New Mexico on the South Canadian River ¼ mile below its confluence with the Conchas River, is the Conchas Dam, being built at an estimated cost of $8,700,000 by the U. S. Army Engineers to provide flood control and to store water for irrigation and water supply for Tucumcari and Amarillo and for railroad shops. The type of dam is undecided. Work has started on a camp for 5,000 men.

✦ **Fort Peck Dam**—During the dredging season, May 1 to Nov. 1, at Fort Peck Dam on the Missouri River in Montana, a total of 20,899,000 cu.yd. was pumped into the fill, bringing the total yardage in the earthfill to 21,742,000 cu.yd. In addition, 2,765,000 cu.yd. of gravel and 274,000 cu.yd. of stone had been placed in the toes of the dam by the end of 1935. In the 13,000,000-yd. spillway cut more than 12¼ million yards have been removed, most of it during the 1935 season. At the spillway-gate structure most of the foundation work has been completed. During the year the four diversion tunnels were holed through, a total of 6,250 ft. of tunnel was enlarged to full size (32-ft. diameter), and 4,600 ft. of lining was placed. The four 60-ft.-diameter control shafts and ac-

McLaughlin Aerial Surveys,

THE TRIBOROUGH BRIDGE at New York was rapidly approaching completion at the end of the year. The new Ward's Island sewage-disposal plant lies to the right of the Hell Gate railway bridge.

companying stoplog shafts were sunk and enlarged to a point about 100 ft. above the tunnels.

✦ **Mississippi Flood Control** — Levee building as a part of the official flood-control plan approached completion in 1935 with the placing of some 40,000,000 cu.yd. of material mostly by contract operations. Under the official plan about 570,000,000 cu.yd. of levee have been constructed since July 1, 1928, and about 80 miles of bank revetment were completed. The outstanding operations of the year have been channel straightening by cutoff channels to eliminate bends. At present a dozen of these cutoffs have been completed, of which three classify as 1935 operations; these twelve new channels reduce the length of the river by 113 miles.

✦ **Lake Okeechobee Flood Control**—Work on the Lake Okeechobee combined flood control project in Florida is about 75 per cent complete. Of the 63 miles of levee around the south shore of the lake only 11 miles remain to be completed. Construction of the 21 miles of levee on the north shore, to complete the flood control work, is expected to start this summer.

✦ **Cahokia Creek Diversion** — During 1935 $2,500,000 was spent on the Caholia Creek diversion by the East Side Levee and Sanitary District in East St. Louis. The greater portion of the whole project is completed, and only a small portion of sewer and channel work is yet to be done.

✦ **Muskingum Valley Flood Control**—Construction of the various dams, levees, railroad and utility changes on the Muskingum Valley flood control project in southeastern Ohio is about one-third completed. Some of the thirteen earth dams are nearing completion; the one concrete dam and most of the other earth dams are well along. High water seriously interfered with construction operations several times during the year.

✦ **Tygart Dam**—Tygart Dam on the Tygart River, near Grafton, W. Va., the first of several planned for flood control on the tributaries of the Monongahela and Allegheny Rivers, will be of the straight gravity type, 1,800 ft. long at the crest, 232 ft. high, containing 1,100,000 cu.yd. of concrete. At present placing of concrete within the second of two cofferdams is just starting; concrete in the first cofferdam has risen high enough to permit the coffer to be removed.

✦ **Winooski River Flood Control**—Work was started last summer on the Waterbury Dam, the third large earthfill dam to be built for controlling floods on the Winooski River in northern Vermont.

Waterways . . .

✦ **South Jetty, Columbia River**—Retopping the south jetty at the mouth of the Columbia River, which was begun in 1932, was advanced 4,800 ft. during 1935, and $1,907,000 was spent—bringing the enrockment to 98 per cent of completion by the end of the year. The present contract, which was to be completed in February, 1936, covers placement of rock on the old jetty.

SOUTH TOWER OF GOLDEN GATE BRIDGE, looking through the gate toward San Francisco. Cable spinning on the 4,200-ft. span began in November.

Aerial Surveys, Inc.

CLEVELAND'S easterly sewage-disposal plant is on a tract of land partly redeemed from Lake Erie. The area inside the breakwater will be filled with material removed from the grit tanks.

✦ **Los Angeles-Long Beach Breakwater** —The 12,500-ft. breakwater being built to protect Los Angeles outer harbor is about half completed; remaining work may require three years.

✦ **Brazos Island Harbor** — Essentially completed in 1935 was the dredging work on the 16½-mile ship channel extending inland from the jetties between Padre and Brazos Islands to the Brownsville (Tex.) turning basin, where extensive terminal facilities are now under construction. The mile-long jetties, costing $2,600,000 and extending gulfward from the two islands, were completed last February.

✦ **Ohio Valley Dams**—The Gallipolis locks on the Ohio River were completed early last year; the roller gate dam at this site was placed under contract in January, 1935, and at the end of the year was about half complete. The Winfield locks on the Kanawha River in West Virginia were completed; the Winfield dam was started late in August. Montgomery Island Dam on the Ohio River was close to completion at the end of the year. Dams 2 and 3 on the Allegheny River above Pittsburgh were finished.

✦ **Upper Mississippi Waterway**—Many of the locks on the Upper Mississippi Waterway were completed last year, including Locks 5A, 6 to 12, incl., 16, 18, 21 and 22. Lock 26 is nearing completion. Progress on the dams under construction during the year is as follows: Dam 5, complete; Dams 5A, 6 and 16, about half finished; Dam 10 one-third complete; Dam 20 is nearing completion; Dam 26 is under way. A 9-ft. waterway is to be provided.

✦ **Chesapeake and Delaware Canal**—This canal, connecting Delaware and Chesapeake bays, was opened in 1826

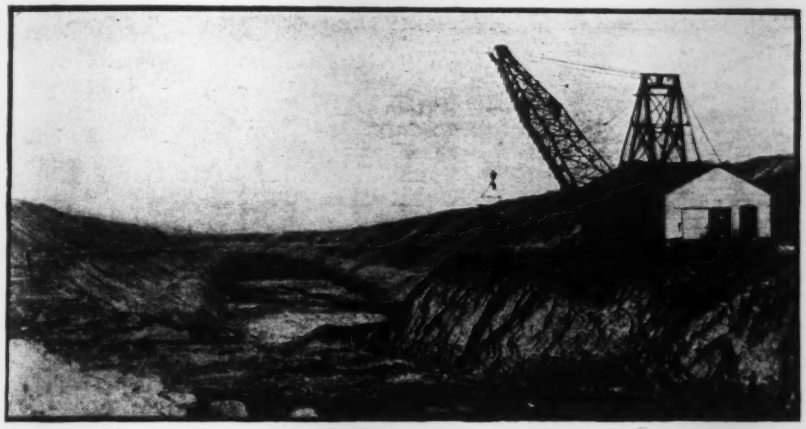
and enlarged in 1926. It is now being widened and deepened without change in length (14 miles) to give a waterway 250 ft. wide and 27 ft. deep, with an initial appropriation of $5,107,000. Contracts were let in 1935 for about 3,500,000 cu.yd. of dry widening above water level, and excavation is now in progress under four contracts.

✦ **Florida Canal**—Fast work in putting the trans-Florida ship canal under construction followed the appropriation of $5,000,000 of WPA funds on Sept. 3. Within 60 days the army engineers had virtually completed permanent camps and had some $3,500,000 of work under construction and contract. At the close of the year, earth-moving was actively in progress upon about ten sections on the main divide. These operations will consume the present appropriation.

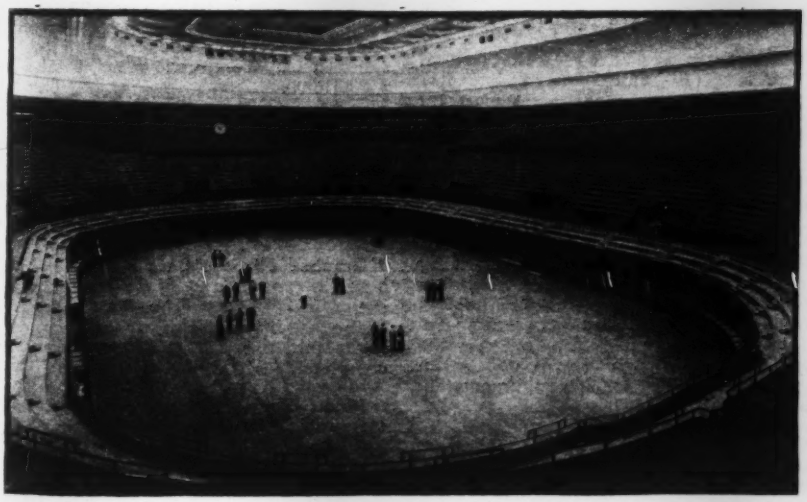
✦ **Cape Cod Canal**—Widening Cape Cod Canal to a top width of 500 and 540 ft. with a depth of 32 ft. was authorized in 1935. Widening to a bottom width of 205 ft. with a depth 25 ft. under a previous authorization was completed during the year as were the three bridges, as noted elsewhere. Work on the extended project is well under way.

✦ **Tennessee River Waterway and Power** — The Tennessee Valley Authority now has under construction five dams for modernizing the Tennessee River waterway and developing hydroelectric power. Norris Dam on the Clinch River, the first project to be started by the TVA, is nearing completion, and water is being stored in the reservoir. The power house, containing two 56,000-kva. generators, will be ready for service this year. Wheeler Dam on the main river above Wilson Dam is entering the final year of construction. Pickwick Landing Dam, below Wilson Dam was begun in April, 1935. The first work undertaken was construction of the dikes and deep sheet-pile cutoff wall. This work is well along. A large cellular cofferdam for construction of the navigation locks has been completed and concrete is being placed in the foundation. Late in 1935 work was started on Guntersville Dam, next above Wheeler, and since the year opened work has started on Chicamauga Dam, third above Guntersville. No power is included in these latter projects.

POWER CANAL, near Genoa, Neb., of the Columbus-Genoa power project of the Loup River Public Power District.



COLUMNLESS ARENA of Kansas City's new municipal auditorium. Over this 225x190-ft. area two 240-ton steel trusses of 226-ft. span carry the roof, while beneath it is reinforced-concrete framing that includes girders 3 ft. wide and 6 ft. deep on spans as great as 86 ft.



Power Development...

✦ **Boulder Dam**—The diversion tunnel at Boulder Dam was closed early in the year, and the dam was a factor in flood storage and flow regulation during the summer; the structure was dedicated by President Roosevelt on Sept. 30, and since then has been entirely completed and traffic over the highway across its crest has begun. Work yet to be finished is completion of penstock and power-house units and installation of certain valves and control apparatus. The 225-mile, 287-kv. power-transmission line to Los Angeles was practically finished by the end of the year.

✦ **Bonneville Dam**—At the Bonneville power and navigation project on the Columbia River 40 miles from Portland, Ore., the cofferdam for the south half of the dam was built, unwatered, flooded during summer high water and pumped out again in the fall. Before the end of the year 210,000 cu.yd. of puzzolanic concrete in the spillway dam had been placed within the south cofferdam. Construction is well along toward completion on the navigation lock, power-house substructure and on some features of the $3,550,000 fishway system.

✦ **Grand Coulee Dam**—The west cofferdam in the Columbia River at the site of the Grand Coulee Dam was completed before high water. From the 60-acre area thus protected several million cubic yards of excavated material were moved out over a mile-long belt conveyor, and bedrock was prepared for concrete. The first concrete of the 1,300,000 cu.yd. included in the present contract was poured early in December.

✦ **Hamilton Dam**—Under the administration of the Lower Colorado River Authority, construction of Hamilton Dam, to produce 25,000 kva., will be resumed as soon as revised drawings can be prepared by the Bureau of Reclamation, which will prosecute the work by force account.

✦ **Sutherland Project** — The Sutherland (Neb.) project of the Platte Valley Public Power and Irrigation District, a combined power and irrigation development, was about 80 per cent complete at the end of the year, including a diversion dam across the North Platte River, 33 miles of canal to the Sutherland Reservoir, which is formed by 6 miles of earth dikes, 22 additional miles of canal to the regulating reservoir above the power house, penstocks, a surge tank and a power house containing 25,000 kw. in generating equipment. Storage of water in the Sutherland Reservoir has been begun.

✦ **Columbus Project** — The Columbus-Genoa (Neb.) project of the Loup River Public Power District includes a diversion dam and desilting works on the Loup River, 12 miles of canal lead-

ing to the forebay of a power house near Monroe, 15 miles of canal from the Monroe power house to a second power house near Columbus, a regulating reservoir and a large forebay at the latter power house, and a long tailrace to the Platte River below the mouth of the Loup. A total of 47,750 kw. will be installed in the two power plants. Work on the reservoir is completed, the canals are 80 per cent complete, the Monroe power house is 17 per cent, and the Columbus power house 8 per cent complete. Work on the diversion dam is held up pending a decision as to the type of desilting work to be built at that point.

✦ **Santee-Cooper Power and Navigation Project**—Preliminary work on the $37,500,000 Santee-Cooper power and navigation project was begun in October with $500,000 of PWA money. Subsequently the WPA allotted $4,500,000 to the project, and since the first of the year the PWA has turned over $5,500,000 more to the South Carolina Public Service Authority on a loan and grant basis. The project calls for a dam across the Santee River in South Carolina to divert it into the Cooper River, a dam and a power plant of 200,000-kw. capacity on the Cooper, and 145 miles of navigation channel in the Santee, Cooper and Congaree Rivers.

✦ **Passamaquoddy Tidal Power**—An allotment of $10,000,000 of relief funds was made in May to start work on the Passamaquoddy tidal power project in Maine, and the Army Engineers began work on the project in June. This has been confined to the construction of both temporary and permanent housing, including the initial unit of a large village for workers on the project, warehouses and service tracks. Also included is the taking of many additional borings, some of them in the deep tidal waters where the dams are to be built, to obtain additional information for the design of the structures. Tentative designs were completed late in the summer but have not been approved, as the exploratory work done to date has indicated that changes will have to be made in the project as originally laid out.

Land Reclamation . . .

✦ **Rodriguez Dam, Mexico**—Rodriguez Dam in Mexico to the south of San Diego was nearly complete at the end of the year, a small amount of work remaining to be done on the bridge across the top of the dam, on the east abutment and in the spillway. Spillway gates have not been installed and may not be for some time to come.

✦ **Central Valley Project** — The state plan for conserving streamflow in the Central Valley in California has been transformed to a federal undertaking, and an initial expenditure of $15,000,000 has been authorized on the total estimated cost of $165,000,000. Early in December it was announced that the initial construction program would be: excavation and preparation for building Kennett Dam, $500,000; construction of Contra Costa conduit canal, $2,500,000; purchase of water rights in San Joaquin Valley, $2,000,000; construction of Friant Dam on the San Joaquin River, $3,500,000; starting Madera Canal, $500,000; starting Friant-Kern Canal, $1,000,000.

COFFERDAM for the navigation lock of Pickwick Dam on the Tennessee River. Placing of concrete in the lock structure was begun late in the year.

✦ **All-American Canal** — Draglines of large size (10- and 12-cu.yd. buckets) have continued to make good progress in excavating the All-American Canal, supplying the Imperial Valley in California. The canal is designed for a flow of 15,155 sec.-ft. About 40 per cent of the total length of main canal and about 41 per cent of the total yardage had been excavated by the end of the year. Meantime at the point of diversion on the Colorado River (Imperial Dam) a permanent camp has been built, the dam is under contract, and active preparations are under way for building the desilting works, which will occupy an area some 3,000 ft. long immediately below the dam.

✧ **Salt River Improvements**—A contract for enlargement of the first of four spillways on dams of the Salt River irrigation project in Arizona was let in December and bids on others have been called. The present work will cost $6,844,000 and includes construction of the Bartlett storage dam on the Verde River near Phoenix.

✦ **Rye Patch Dam**—Construction of Rye Patch Dam of the Humboldt Irrigation project in Nevada, near Lovelock, a rolled earth fill 75 ft. high, is about 50 per cent complete.

✦ **Red Bluff Irrigation Dam**—Built to store 300,000 sec.-ft. of flood waters of the Pecos River for seven irrigation districts, the Red Bluff semi-hydraulic-fill dam will also generate 10,000,000 kw.-hr. of electricity annually. In dollar value this $2,000,000 PWA project is 53 per cent completed. Excavation for the spillway and spillway inlet and outlet channels is nearly complete. Of the dam embankment one-half of the 2,000,000 cu.yd. has been placed, as has 3,400 cu.yd. of concrete in the outlet and river-diversion conduits through the west rock bluff. All work will be completed by the end of the year.

✦ **Yakima-Roza Project**—Contract for three tunnels of the Roza division of the Yakima-Roza irrigation project in Washington was let in December. The project includes a diversion dam canal, laterals serving 72,000 acres and provision for a hydro-electric plant, total cost $18,451,000.

✦ **Vale Project**—The Agency Valley Dam of the Vale irrigation project in Oregon, a 90-ft. rolled-fill storage dam, was completed in December. Work on the 20-mile Willow Creek canal is in progress.

✦ **Owyhee Project Canals**—The canals, laterals, tunnels and canal structures of the Owyhee project in Oregon and Idaho are all under contract and nearing completion. The 530-ft. dam was completed in 1932.

Moon Lake—Moon Lake Dam near Deschutes, Utah, of the Moon Lake Irrigation project is 30 per cent complete. It is a 90-ft. earth fill. Canals and canal structures are included.

✦ **Boise-Payette Project**—Contracts for four tunnels in the canal system of the Payette diversion of the Boise-Payette Irrigation project in Idaho were let in January, 1936. The work, costing $5,800,000, covers a canal system supplying 47,000 acres.

✦ **Upper Snake River Storage**—Contract for Island Park Dam of the Upper Snake River project in Idaho was let in September. It is an earth fill 80 ft. high. The dam is on the North Fork of the Snake River.

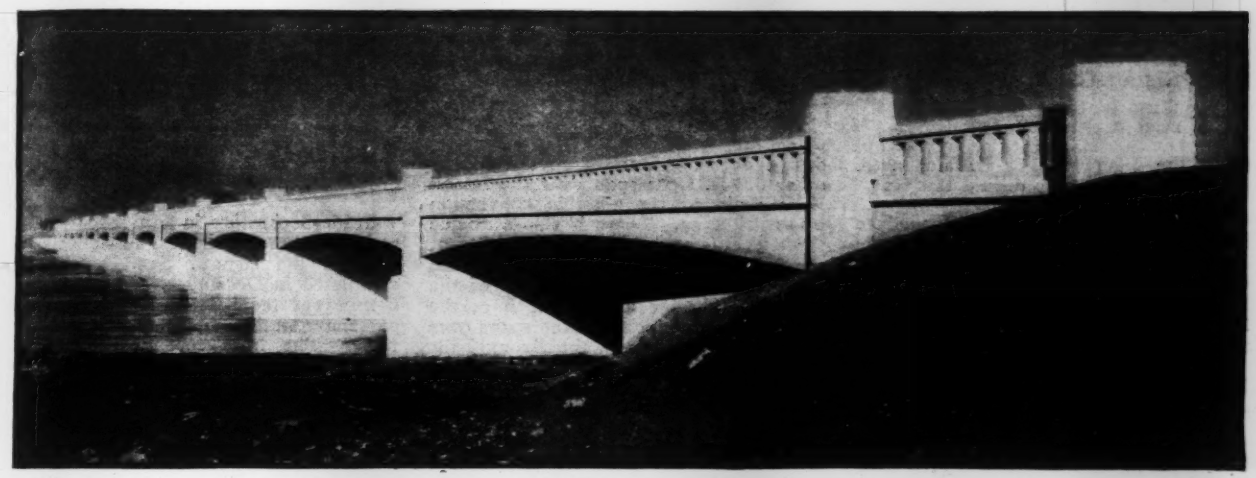
✦ **Ogden River Project**—Work on Pine View Dam, the main feature of the $3,500,000 Ogden River project to provide a supplementary water supply for the irrigation of lands near Ogden and Brigham City, Utah, was 55 per cent completed on Jan. 1. Reconstruction of the Ogden City domestic water supply, involving 47 artesian wells to be inundated by the 41,000-acre-ft. reservoir, is 100 per cent complete, as are 10½ miles of highways up either side of Ogden Canyon. A 5½-mile 75-in. creosoted wood-stave pipe line down the canyon to the penstock of the Utah Power & Light Co. and the Ogden-Brigham and South Ogden high-line canals is 90 per cent completed. The first 11 miles of the 33½-mile Ogden-Brigham Canal, including 4,400 ft. of tunnel, all to be lined with concrete, has been built. This represents 35 per cent of the total. Bids for the balance of the canal work were received Dec. 20.

✦ **Uncompaghre Project**—Taylor Park Dam of the Uncompaghre irrigation project in Colorado is 25 per cent complete. It is to be an earth and rock fill structure 168 ft. high. Canal repair work also is in progress.

✦ **Bull Lake Dam**—Contract for Bull Lake Dam of the Riverton irrigation project in Wyoming was let in December. It is a 75-ft. earth fill. Canals and canal structures are included in the project, estimated to cost $8,760,000.

✦ **Casper-Alcova Project**—Contract for the $2,800,000 Seminoe Dam and power plant of the Casper-Alcova project was let in 1935, but no work was done. Completed are the following items at Alcova where a $1,500,000 dam is under construction: 2,800-ft. of 14-ft.-diameter river diversion and outlet tunnel, an intake structure for the irrigation canal, two 14-ft.-diameter concrete siphons, of 500-ft. total length, 2¼ miles of 34-ft. base width canal, and 4,400 ft. of 14-ft.-diameter tunnel. At Alcova Dam, 13,700 lin.ft. of grout holes were drilled and 134,000 cu.ft. of grout were placed to seal off hot springs. Placed in the dam are 32,000 cu.yd. of rockfill and 44,000 cu.yd. of sand, gravel and cobble fill. On the Casper Canal a contract of 10,500 ft. for $750,000 has been let, but no work has been done. Three electric draglines will be used.

✦ **Shoshone-Heart Mountain** — Three tunnel contracts for the canal system to irrigate 35,000 acres of the Heart Mountain division of the Shoshone project in Wyoming were let in December. Total cost of the work will be $6,500,000.



KANKAKEE RIVER BRIDGE, near Wilmington, Ill., a concrete structure of twelve 80-ft. spans.

Bridge Construction...

✦ **Golden Gate Bridge** — The south tower, which was the second of the two 746-ft. towers to be built for the Golden Gate Bridge at San Francisco, has been completed, anchorages and pylons are finished, and catwalks and sway cables are in place. Cable-spinning began early in November, and despite storms and fog a steady spinning progress has been made on the 4,200-ft. span. Before the end of the year ten strands had been spun, five over each catwalk. Meantime work has been advanced on approach cuts and structures.

✦ **San Francisco-Oakland Bridge** — Cable spinning on the west half of the West Bay Crossing of the San Francisco-Oakland Bay Bridge is finished; spinning on the remaining suspended portion was to be completed in January. Progress has been up to or ahead of schedule on driving and lining the tunnel 79 ft. wide through Yerba Buena Island and in steel erection on the East Bay Crossing. The latter includes a 1,400-ft. cantilever span. Erection of the suspended structure in the West Bay Crossing began Dec. 18, and on the west half of this crossing the floors on both deck are to be in place by May 1. The bridge is to be opened to traffic about Nov. 1, 1936.

✦ **Oregon Coast Highway Bridges** — The ambitious bridge construction program which the Oregon State Highway Commission has under way along the shore of the Pacific has progressed so consistently under the five separate contract that ferries at all five locations are to be replaced by bridge service during 1936.

✦ **South Omaha Bridge**—A new Missouri River bridge, 3½ miles south of the Omaha business district, was opened to traffic in the early fall as a publicly-owned toll structure. It consists of nearly a mile of high-level truss viaduct and a channel crossing consisting of a through continuous truss of two 525-ft. spans.

✦ **New Orleans Bridge**—The largest bridge completed during 1935 was the new Mississippi River bridge west of New Orleans, which serves both highway and railway traffic. Over four miles of bridge structure are required because of the long double-track railway approaches on a 1.25 per cent grade that must rise to the 135-ft. shipping clearance height of the main bridge, which is a through cantilever with a 790-ft. main span and 530-ft. anchor spans. The railway deck is between the trusses, and the highway decks are cantilevered at either side.

✦ **Davenport Bridge**—Another Mississippi River crossing that was opened during the year serves the tri-city group of Moline and Rock Island, Ill., and Davenport, Iowa. One half of the bridge is a suspension structure with a 740-ft. main span. In the other half are two three-span continuous deck truss units.

✦ **Grand Island Bridges**—These two continuous-truss bridges that carry the highway over the Niagara River from the mainland to one end of Grand Island and then from the other end of the island back to the mainland, thus short-

McLaughlin Aerial Surveys.

NEW YORK'S CIVIC CENTER was enlarged last year by the towering federal court house, center, and the building of the sanitation and health departments, lower left. The hexagonal building is the city court house, and the building to its left houses the state offices. The Municipal Building, built many years ago, is at the right.

ening the Niagara Falls-Buffalo route, were opened to traffic during the year.

✦ **Rip Van Winkle Bridge**—Opened to traffic in the fall, this new high-level crossing of the Hudson River south of Albany provides a new motor route into the Catskill Mountains. In its 5,000-ft. length are 3,300 ft. of deck trusses and a through cantilever bridge with a main span of 800 ft., providing a 142-ft. clearance over the navigable channel.

✦ **Triborough Bridge** — Rapid progress was made on this $42,000,000 project in New York City consisting of a 1,380-ft.-span East River suspension bridge with the unprecedented width for a two-cable bridge of 98 ft.; 13,500 ft. of viaduct; a 310-ft. vertical lift span of unusual design over the Harlem River and another 350-ft. truss span over the Bronx Kills designed for possible conversion into a lift span. There is also a unique three-level concrete grade-separation at the Y-intersection of the project. The year saw the virtual completion of the suspension bridge and of much of the viaduct. Foundations for the spans over the Harlem River and the Bronx Kills were completed, and work was began on the grade-separation junction. The 3½-mile project with its 14 miles of connecting roads is scheduled to be opened in 1937.

✦ **Cape Cod Canal Bridges** — Three bridges of major size—two highway and one railway—were completed over the Cape Cod Canal in Massachusetts. The road bridges are high-level structures of arched continuous-truss type with main spans of 616 ft., providing 135-ft. shipping clearance. The railway bridge, a vertical lift, has the world record span of 544 ft., to accommodate the future widening of the canal to 500 ft. The span will be maintained in the open position most of the time, giving a 135-ft. shipping clearance. All three of these bridges replaced old drawbridges of 160-ft. span.

BIG MORONGO SIPHON, a typical example of the many miles of concrete aqueduct on the Colorado River Aqueduct.

Transportation

✦ **Los Angeles Union Passenger Terminal**—Southern Pacific, Santa Fe and Union Pacific railroads are cooperating in the construction of a $9,000,000 union passenger terminal at Los Angeles. Thus far all rights-of-way have been secured, agreement with the city has been reached on grade-separations, and a fill wide enough for 26 tracks (of which only 21 will be installed now) has been placed for elevated tracks at the depot. Much preliminary work has been finished, including the passenger subway and the utility tunnel. The project as a whole is about 30 per cent complete. Architectural studies of the station proper are under consideration.

✦ **Grade-Separation in San Jose**—A new route for the Southern Pacific Railroad through the city of San Jose, Calif., completed in December, involved nearly 6 miles of main-line relocation, a new passenger station, and nine grade-separations. The total cost of the project, including rights-of-way, signal equipment, etc., was $3,250,000.

✦ **Oakland Express Highway**—Except for lighting and relocation of a park road, construction in Forest Park west of the Kingshighway ramp on the St. Louis-Oakland express highway was completed at the end of 1935. Pavement on the Kingshighway ramps will be laid in March and the Forest Park section opened to traffic in May. East of Kingshighway the depressed parkway section is under construction as are three bridges. Except for the Van Deventer Ave. overhead connection at Choteau the whole project will be open to traffic in early fall. No funds are yet in sight for the proposed elevated extension down Choteau Ave. to the business district and Municipal Bridge.

✦ **Chicago Outer Drive Bridge**—Late in 1935 PWA funds were granted for completion of the $11,600,000 Chicago Outer Drive bridge project on which $4,100,000 had been expended when work was shut down in 1932. Work was officially resumed in January, 1936. The completed work includes the north approach between Ohio St. and the Michigan Canal involving a fill between retaining walls, viaduct, cutting through the North Pier Terminal building, the depression of Grand Ave. and sewer and conduit work. The substructure work of both the Michigan Canal and Chicago River bridges has been completed. The superstructure steel for the Chicago River bridge is in storage at Gary ready for shipment. Contracts have recently been let for the south dock, south plaza closure, subpier foundations for the south

approach viaduct to Randolph St. and south portion of the new 128-ft. Randolph St. viaduct extending westward to Michigan Ave. Plans are complete for the superstructure of the Michigan Canal bascule and various viaduct structures. The schedule calls for completion in 18 months.

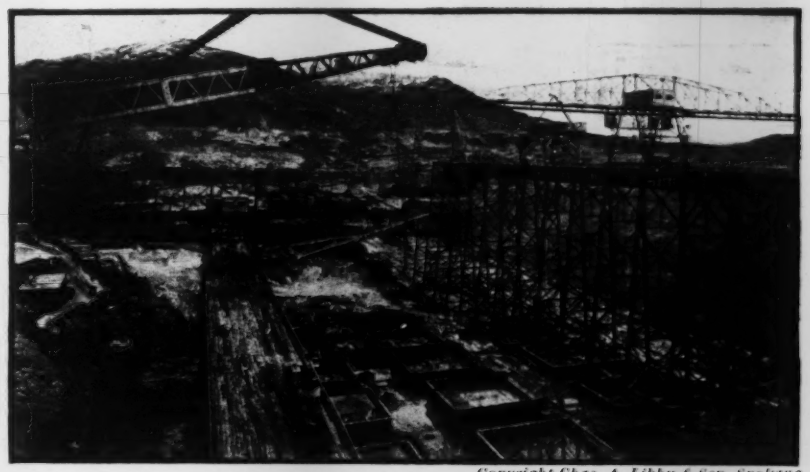
✦ **Syracuse Track Elevation**—Elevation of the New York Central R.R. through Syracuse, N. Y., is nearing completion, and trains are expected to operate over the high line by the end of the current year. All of the 27 bridges have been completed; building of the earth fill between street bridges is well along. Progress was made last year on the construction of the new passenger station, part of the improvement program. Mail and express terminals are yet to be built.

✦ **West Side Railway Line, New York**—Work on the depressed section of the New York Central's new West Side Railway line in New York City was begun in 1935. The elevated section, beginning about 35th St. and extending south to the St. Johns Park terminal at Canal St., was put into service in 1934. In the section north from 35th to 42d St., the right-of-way has been acquired, but many of the buildings remain to be demolished. Work on the open cut in this section has just begun. North from 42d St. to the point where the line crosses under West End Ave. (11th Ave.) into the 60th St. yards, most of the open cut, largely in rock, has been taken out for a width sufficient for three tracks, and many of the bridges carrying the streets across the width of a four-track cut have been completed except for minor details.

✦ **New York Elevated Highway**—On the West Side elevated highway along the Hudson River waterfront in New York City, contracts were let for the section between 46th and 59th Streets, the only section not completed and in service in the 4-mile length between Canal and 72d Streets. Work on this section was held up pending completion of the new 1,000-ft. river piers. Authorization was given during the year for an extension of the highway southward from Canal to Rector Streets, and design is now under way. North of 72d Street the elevated was extended to 76th Street over the New York Central tracks. The section from 76th to 79th Streets is under contract, and from 79th to 82d Streets has been advertised for bids.

✦ **Henry Hudson Parkway**—This extension of Riverside Drive in New York City northward and across the Harlem River to a connection with Westchester County's Saw Mill River Parkway advanced from planning to active construction during the year. The foundations for the Harlem River crossing are in place, and the skewbacks are set for the 800-ft. hingeless steel arch, a new record length for this type.

✦ **Long Island Parkways**—The principal addition to the Long Island parkway system was the 3½-mile Interborough Parkway connecting Grand Central Parkway at Kew Gardens with Brooklyn. The Grand Central Parkway Extension from Kew Gardens toward the Triborough Bridge was brought to a stage permitting paving in the spring. Laurelton Parkway, connecting Southern State Parkway with Sunrise Highway in Queens, was opened with the exception of bridges near the Sunrise Highway junction. Work continued on the rebuilding of Sunrise Highway to parkway standards. Bethpage Parkway, planned to connect Northern and Southern State Parkways in Nassau County, was also the scene of bridge building and grading during the year in preparation for the paving.



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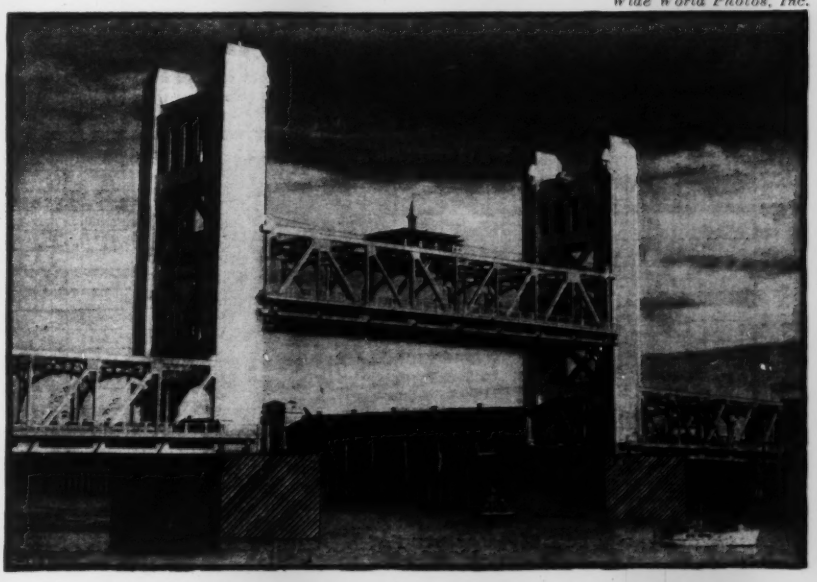
GRAND COULEE DAM, looking from the mixing plant along the line of the dam. Placing of concrete is underway in the foreground, using gantry cranes running on the two steel trestles here shown. The trestles will be built into the dam as it rises. The river is behind the cellular cofferdam shown above the lower gantry crane.

✦ **New York Subways**—Miscellaneous construction toward completion of the New York Independent Subway System continued during 1935. Operation on new lines during the year includes part of the Brooklyn-Queens crosstown line and the Houston St. line in Manhattan to East Broadway. Contract was awarded for part of the Sixth Ave. line late in the year; construction will commence shortly.

✦ **Midtown Tunnel**—Phenomenal progress was made in driving the single-tube Midtown Tunnel under the Hudson River at 38th St., New York. During the year the tunnel was holed through, the muck ballast left during shield driving was removed, and placing of the concrete lining got under way, work being carried on westward from the New York ventilation shaft. The New York approaches are well along; those for the New Jersey end were placed under contract late in the year. A contract has been let for the tunnel tile lining.

THE TOWER BRIDGE, Sacramento, Calif., a 202-ft. lift span with towers enclosed in steel plates to accentuate their massive character.

Wide World Photos, Inc.



Trends in City Transit

PASSENGER statistics show that the streetcar is not passing out of service as rapidly as would appear from increase in use of buses, and car improvements based on research may actually check decline

By JOHN A. MILLER
Editor, Transit Journal

STREETCARS, buses, subways and elevated railway lines of the transit industry in the United States carry an average of over 35,000,000 passengers a day, or about 12½ billion passengers a year. This number has been equalled or exceeded every year for the past twenty years, except during the depth of the recent depression. Demand for transit service has thus held up despite the tremendous increase in automobile registrations, which twenty years ago were less than a quarter of what they are today.

Though the aggregate demand has not varied greatly over this period, the physical plant used to render the service shows many significant changes. At the beginning of 1916 the electric railway enjoyed a virtual monopoly of the transit business. Today the electric railway is only one element—but still a very important one—in a much diversified picture. Moreover, the industry is confronted by conditions that make further changes inevitable.

While the first so-called "jitney bus" made its appearance on the streets of Los Angeles as early as the summer of 1914, it was not until Frank Fageol designed a low-floor, built-for-the-purpose motor bus in 1921 that responsible transit operating companies began to utilize the automotive vehicle extensively for public passenger transportation. Since that time its development has been continuous and rapid, until now there are nearly 20,000 motor buses being operated in transit service on some 25,000 miles of route.

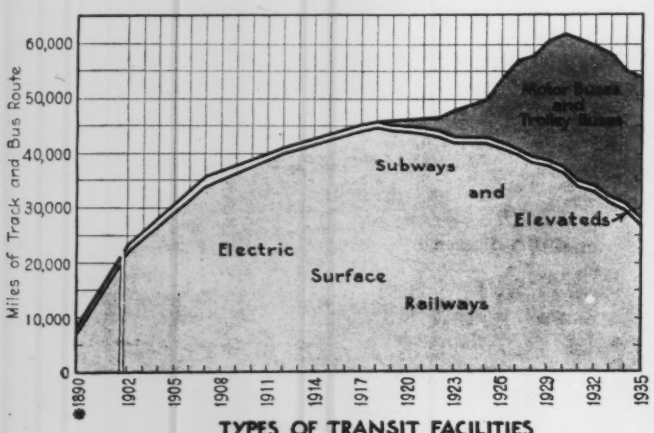
A new vehicle, the electrically operated trolley bus, or "trackless trolley," has also entered the picture, though not as yet on a very large scale. Meanwhile the trackage of the electric surface railways has shrunk from about 44,000 miles to 26,000 miles, and the number of cars from 73,000 to 40,000. Rapid-transit electric railways have expanded from 500 miles of track and 5,000 cars to 1,200 miles of track and 10,000 cars. Since only four cities in the country have facilities of this kind, however, their influence on the general transit situation has been limited.

Closely following the development of the first built-for-the-purpose buses, two small cities changed over from street railway service to all-bus service. Year by year this trend has continued until there are now 125 of the 376 cities of more than 25,000 population in the United States where all local transit service is being rendered by motor bus or trolley bus. In some 200 more of these cities the motor bus or the trolley bus has been adopted to render a part of the service. To a very large extent these bus operations are under the same management as the electric railways, which operate, or did operate, in the same territory.

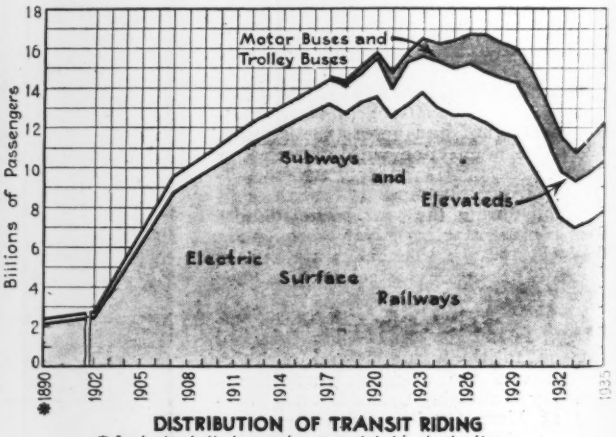
While buses have become a very important factor in the transit field from the standpoint of number of vehicles and miles of route, they have not assumed equal importance from the standpoint of passengers carried. Out of the 12½ billion passengers carried last year by the transit industry as a whole, the bus passengers numbered only about 2 billion, or approximately 16 per cent of the total. Street cars carried 8 billion, or 64 per cent, while subway and elevated lines carried 2½ billion, or 20 per cent of the total.

The reason for the proportionately smaller development of the bus patronage as compared with the bus facilities, is that the bus has been introduced in the main on routes where the riding is comparatively light. Not all bus operations, of course, are of this character. In the city of New York, for example, the New York Railways are now operating with notable success about 200 motor buses on the heavily traveled routes on Madison, Eighth and Ninth Avenues. In Chicago, the Surface Lines operate trolley buses on the important Central Avenue route. Buses, both gasoline and electric, are being operated also on a considerable number of other heavy lines in large cities. In the main, however, the bus development has taken place on the lighter lines and in the smaller cities. Of the 125 cities which have substituted bus or

THE ELECTRIC RAILWAY still is an important element in the transit business. Though its mileage has been greatly reduced since 1918, it still carries more passengers than buses, elevated railways and subways combined.



TYPES OF TRANSIT FACILITIES
** Includes both horse-drawn and electric street railways*



DISTRIBUTION OF TRANSIT RIDING
** Includes both horse-drawn and electric street railways*

trolley bus service in place of all electric railway service, 94 have populations under 50,000, 22 have populations between 50,000 and 100,000, and only nine have populations of more than 100,000. Largest of the all-bus cities is San Antonio, Texas, with a population of 231,542.

Among the cities of more than half a million population, none has seriously considered the abandonment of its electric surface railways in favor of buses. On the contrary, the surface railway systems serving these cities are continuing to operate about 95 per cent of the track mileage operated in their peak year.

RAPID EXPANSION in the use of buses for city transit in recent years appears to indicate that streetcars, with their problems of pavement maintenance and traffic delays, will soon be a thing of the past. If this impression is correct, it is of special significance to engineers interested in municipal affairs and municipal traffic problems. Close examination of statistics of city transit indicate that it is not entirely correct.

In the accompanying article the correct picture of what is taking place in city transit is set forth by John Miller, a close student of urban transportation. Mr. Miller's comment will be found of value to those who seek to look beneath surface indications to obtain more accurate understanding of what may be expected to take place in city transit in the future.

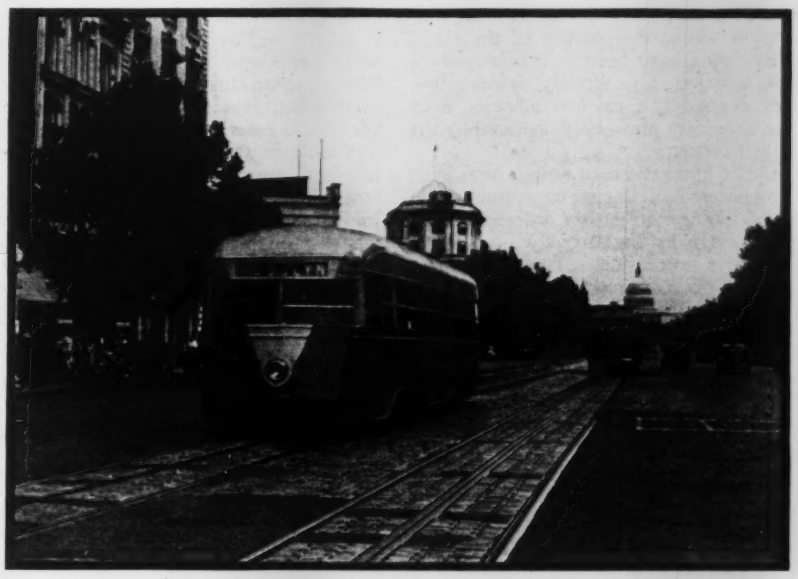
—Editor.

In the cities between 100,000 and 500,000 population, the decline in street railway track mileage has been somewhat greater. There the companies are now operating about 80 per cent of their peak track mileage. In contrast to the stability of the rail operations in the cities of more than 100,000, however, we find that the track mileage in the smaller cities has dropped to a little below 50 per cent of the peak figure.

Trends not definite

That the trend to bus operation in the smaller cities will continue seems evident. The direction that developments will take in the larger cities remains to be seen. At the present time the transit industry is operating some 37,000 streetcars that are more than fifteen years old, some of them being as old as 20 or 25 years. Many of these antiquated cars are to be found in the large and medium-size cities as well as in the small cities. Certainly they will have to be replaced in some manner in the near future. To what extent they will be replaced by new streetcars, and to what extent they may be replaced by motor buses or trolley buses will depend upon economic considerations that cannot yet be gaged accurately.

Advances in motor-bus design have been spectacular and have attracted wide attention. The original "jitney bus" was merely a five- or seven-passenger automobile. Modern motor buses have seating capacities as high as 40 for the single-deck type and more for the double-deck type, although the latter appears to have only a limited field of usefulness. Engines, brakes and other mechanisms have been vastly improved. As a result, the bus of today is capable of rendering service comparable in most respect to that of a medium-size streetcar.



THE DESIGN OF STREETCARS has been radically improved as the result of extensive research. The car here shown is one of twenty put into service in Washington last year.

Equally significant advances have been made in the design of the electric trolley bus. This type of vehicle combines some of the advantages of the streetcar with others of the motor bus. More than 600 of them are now being operated on some 500 miles of route in 27 cities. An interesting development of the past year was the design of a so-called "all-service" vehicle for Public Service Co-ordinated Transport of New Jersey. This is a combination gasoline-motor bus and electric trolley bus that can be operated either way by adjustment of the control. Advantages claimed are that it can utilize the economical and abundant supply of central station power available through the trolley wires and can at the same time secure complete maneuverability by pulling down the trolley poles and operating as a gasoline-motor bus.

Progress in design, however, has not been confined to the rubber-tired vehicles. During the past five years an extensive program of research in car design has been carried out by the Electric Railway Presidents' Conference Committee at a cost of nearly $1,000,000. No cars have yet been completed according to the final designs worked out by this committee, but some are under construction. During the past year, the Capital Transit Co., Washington, D. C., placed in service twenty new streetcars containing a number of significant innovations in design, some based on this research work and others developed by the engineers of the operating company and the manufacturers.

Mechanical improvements in cars

Increased speed has been obtained with new types of control, which permit smooth and rapid acceleration by changing the resistance in the motor circuits in a greatly increased number of steps. A combination of clasp-brakes and magnetic track brakes affords more rapid retardation Notable reduction in noise has resulted from the elimination of a large part of the unsprung weight and the extensive use of rubber in the design of the trucks In one design of truck the journal boxes are mounted on movable arms pivoted to the truck-side frames, thus doing away with the conventional pedestals and guides that are often a source of vibration and noise. Springing is effected by a combination of steel coil springs and rubber. In another design of truck the journal boxes are attached to spring barrels within which are rubber pedestal springs. No steel springs of any sort are used in this design.

Resilient wheels are being tried under some of these cars as an additional means of eliminating noise. These wheels are so designed that there is no continuous metal path from the rail to the axle, rubber cushions being introduced between the hub and the tread of the wheel. As yet, there has not been sufficient experience with these wheels to permit determination of the practicability of the design.

The appearance of the Washington cars has been enhanced by streamlining and careful attention to painting. Im-

proved illumination and mechanical ventilation add to the comfort of the rider. While they have been in service only a few months, it is already evident that they represent a marked advance over any streetcars previously operated by the transit industry.

Other innovations in design have been incorporated in the specifications for a lot of 100 new streetcars ordered several months ago by the Brooklyn & Queens Transit Corporation. These specifications follow more closely the designs developed by the Electric Railway Presidents' Conference Committee than do the specifications for the Washington cars. It is expected that deliveries will be made in the early part of 1936, and an opportunity will be afforded for thorough tests of the new designs in actual service.

Until there has been considerable operating experience with these new types of cars, it will be impossible to determine what lies ahead for the street railway. Where motor buses or trolley buses have been substituted in place of streetcars, the public reaction has been universally favorable to the change, but the actual increase in gross revenue has been quite small in most instances. Operation of improved types of rail cars, therefore, may reasonably be expected to produce equally good results from the standpoint of revenue.

Where a sufficient volume of riding exists, the operating cost of a streetcar is ordinarily lower per passenger carried than that of a motor bus or a trolley bus. On the other hand, the car has to meet heavier fixed charges on the vehicle, track and power investments. It is hoped that quantity production of the new types of car will bring the first cost down to a figure reasonably comparable to that of the rubber-tired vehicles. It has been suggested, too, that the use of the newer cars with less unsprung weight will permit the employment of lighter and less expensive track construction. One such design now being tried eliminates the ties altogether, the rails simply being held in place as part of a solid concrete pavement. Again, time will be needed to demonstrate the practicability of the design.

Thus it will be seen that there is insufficient basis at present to forecast the future developments in surface transit. The most that can safely be predicted is that the transit industry stands today at the threshold of developments as significant as any through which it has passed in its long history.

New Days of Power Use

UTILITIES last year produced 99,000,000,000 kw.-hr. of electricity—Industrial recovery is paralleled by greater domestic use of power—Plants at most economical loads

L. W. W. MORROW
Editor, Electrical World

ELECTRIC POWER USE in this country today exceeds all past records. The past year brought a sharp rise out of the power slump of the preceding three years; during 1935 the public utilities generated 98,670,000,000 kw.-hr., as against their previous maximum output of 97,352,000,000 kw.-hr. (1929). Because of this rise it is estimated that during 1936 the federal government and the utilities will make capital expenditures of at least $500,000,000 to increase facilities for the production and distribution of power. It is clear, therefore, that prospects for even greater power use are promising.

This surprising and rapid return to pre-depression magnitude in the use of power can be accounted for by two major facts. The first is an increase in general industrial activity in all sections that causes a larger use of electricity by many industries, and with it the fuller adoption of electrical methods and processes. The second is the increase in domestic, rural and small light and power use of electrical energy resulting from the introduction of new devices from lower rates, and from aggressive selling and sales promotion.

American industry includes about 12,000 industrial establishments, the value of whose products in 1929 amounted to $75,500,000,000. At that time they used the equivalent of 32,000,000 kw. of power, of which their own stations had installed 15,100,000 kw. and the remaining 16,900,000 kw. represented purchased power from utilities. The cost of fuel and purchased energy for these establishments in 1929 was $1,966,165,000.

RECORD USE OF POWER was among the most sensational phenomena of 1935 history. Even the high figure of our last prosperity year, 1929, was surpassed, and this despite the fact that industrial activity remained far below the high pitch of that year.

Industry has been changing its method; it is using power much more intensively. But the gain in household use of electricity is the outstanding feature of today's power growth. Old uses and new uses of current share in bringing about this gain, and an end to the growth is not yet in sight.

Thus a new era is taking form, one in which power promises to play a larger part in family and community life. So profound a trend of change is certain to influence the physical basis of community growth in many directions. Clearly, it is a movement that claims the attention of the engineer as a determining factor in all future development problems.

—Editor.

During the past sixteen years the additions of power needed by these industrial establishments have been supplied mainly by purchased power. At the present time these manufacturing plants have not sufficient business to produce a value of products more than 70 per cent of 1929 values, and consequently it might be thought that power use should be in the same ratio. A glance at the wholesale power sales of the utilities, however, shows that power use is now at about 1929 levels.

Several facts combine to explain this apparent discrepancy. In the first place the statistical term "wholesale power" includes utility sales of energy to all large purchasers, and factories are only one group in this class of customers. In the second place—and here is the most weighty reason—great changes have been made in the processes and methods used in industry in recent years. For example, electric power has made great strides in oil-well pumping, in irrigation, in mining and in the chemical industries. In automotive, steel and in metal fabrication the use of electric power to drive motors, as heat and for welding, has increased in use in far greater proportion than the value of products produced.

Another aspect of the industrial situation is the effect of obsolescence. Surveys indicate that about 30 per cent of the industrial power plants are more than fifteen years old, and an equally large percentage applies to the age of factory equipment such as machine tools. When competitive conditions force an industry to modernize, the modernization in most instances takes the form of a greater use of electric power through the replacement of obso-

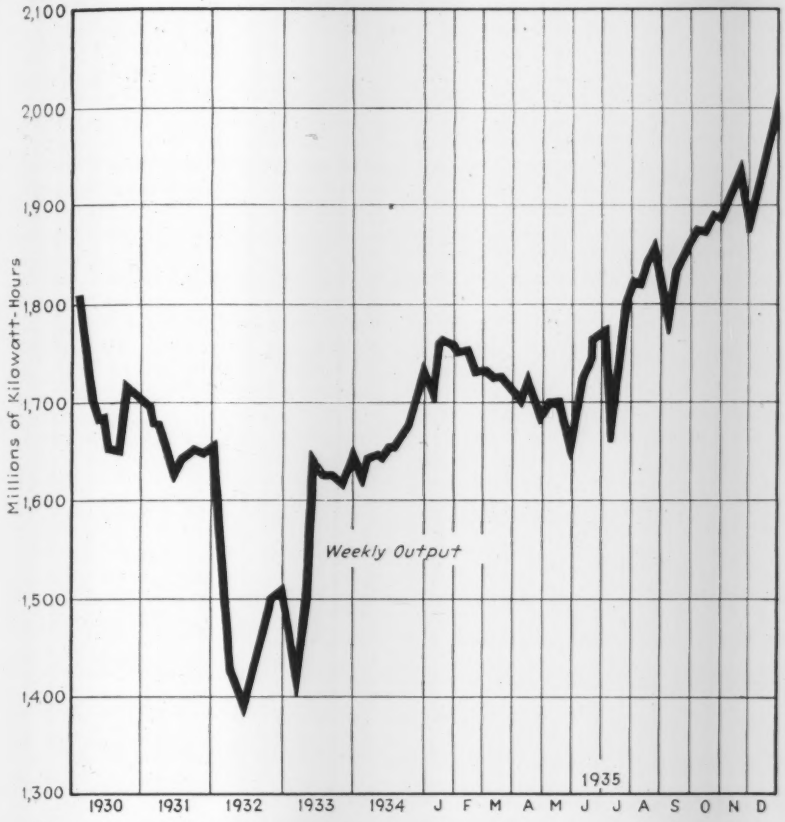


FIG. 1—POWER OUTPUT of the electric utilities during the latter part of 1935 exceeded all past records.

lete factory equipment with more up-to-date electrified apparatus.

Still another significant trend in industry is the growth of new enterprises. New synthetic chemical products call for electric power and often for electrical production processes. Decentralization of production has made the local or market-area factory economical, so that many small new factories have been built. Many older industries have become mechanized to a larger extent or have built branch factories. Where the foundry used to dominate, the plant that fabricates machine parts out of steel plate by welding now largely prevails.

Thus it is evident that while the value and magnitude of products produced by industry still remain at about 70 per cent of 1929 levels, changed and new conditions in industry have resulted in a large increase in the use of electric power. Competitive conditions, precision in manufacture, labor costs and marketing costs all force greater power use and tend toward constant increase in the use of modern electrified equipment and controls. This trend, now quite evident, promises to continue for some time.

More power to the home

Commercial and domestic use of power has increased in even more marked degree. One cause of this change is the national and local propaganda to popularize electricity and electric products; the intense public interest in TVA and REA reflects this effort, which has had a positive effect on sales. Another cause is the aggressive selling of new and old electrical household devices—refrigerator, range, water heater and air-conditioning.

In addition to homes, however, the theaters, stores and office buildings also have been exploited as markets. Street and highway lighting activity has received new impetus by increased interest in traffic control and safety; water pumping on the farms is common; rural electrification is a growing business; railroad electrification has increased in mileage.

Increase destined to continue

A study of the markets for power thus shows that many causes are cooperating to bring about greater power use than in former years. Propaganda, sales, new methods, new products and economic conditions all have worked toward more power for all uses, and the evidence is unmistakable that a further increase may be expected this year with the upturn in business.

Present capacity in utility power plants aggregates 35,803,628 kw., of which 25,377,882 kw. is steam and 9,859,764 kw. is water power. During 1935 a total of 356,965 kw. was installed in utility plants (aside from 300,000 kw. added to industrial power plants), and reports to date indicate an addition of 850,000 kw. in 1936. Federal water-power projects in 1936 will add another

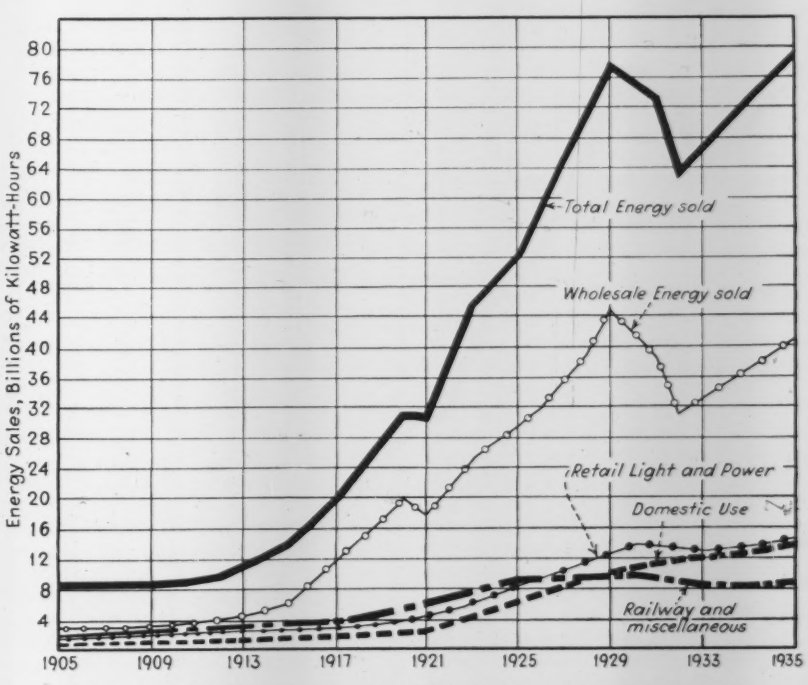


FIG. 2—A DIVISION of utility energy sales between classes of customers shows that industrial use (wholesale energy sold) is still below that of 1929.

300,000 kw. While load factors have improved, it is significant that the closing months of 1935 found utility capacity used with a closer margin of reserve than in the boom period of 1929-1930, so that continued increase in power use will necessitate a rapid installation of power-station capacity.

In studying these striking figures of growth, some significant aspects of the development of power from water and fuel need to be considered. Undoubtedly the federal projects will create a large increase in waterpower capacity in the near future. These projects, however, are distant from loads and are expensive when measured by unit costs. On the other hand, where loads now exist and where power is needed, the trend is toward fuel stations, because few undeveloped waterpowers are cheap or well located, and because power economics favor the development of power where the loads exist.

Modern steam plants, to use about 12,000 B.t.u. per kilowatt-hour output can be built for $100 per kw. or less, and the development of the compact single-boiler turbine-generator plant makes it possible to utilize these plants in relatively small capacities as contrasted to the older conception of the superpower type of station. A general trend is evident toward using several plants instead of one large plant in a region. Transmission is rapidly being relegated to the function of providing tie lines between generating stations.

Another element in power supply is the superposition of high-pressure units on old low-pressure plants, both in industrial plants and in utility stations.

With an intensified use of power accompanied by increased demands for continuity of service, the general principle of installing generating capacity at the load is being adopted as most economical in the areas where population and manufacturing densities are large. It is quite evident that the economics of power supply points to the further adoption of this principle in the future. This is contrary to the idea held in some quarters that the future power supply of this country will be made up of large power plants with far-flung high-voltage transmission lines reaching to load centers.

In short, the British Grid idea, however much it may appeal to the imagination, fails to check with the economics and the service requirements of power supply.

Water Resources Studies

A COORDINATED MOVEMENT to explore the nation's stock of water resources and plan for their systematic conservation and utilization has begun and is producing results

THORNDIKE SAVILLE

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DEVELOPING from a half-century's slow growth that goes back to the days of Major Powell, a systematic movement for cooperative study of our water resources took definite form in 1935. Its first work is to obtain fuller knowledge of these resources; the next, to develop plans for their efficient utilization. All the uses of water are comprehended in this movement, and the problems of stream pollution are engaging close study. Through his connection with the Water Planning Committee and later the Water Resources Committee, the author is able to speak with full authority on the character and results of the movement. —EDITOR.

BECAUSE of long recognized water needs, sensationally emphasized by the natural events of the recent past, a coordinated water resource study of countrywide character became definitely established during the past year, through active cooperation of state governmental groups with national groups. The significance of this movement is clearly apparent, in view of the immediate need of many communities for increased water supplies and growing troubles from stream pollution. Destructive floods have given further reason for systematic investigation of our waters, as have in lesser degree the requirements of navigation and power.

The origin of the movement goes back more than two years, to the creation of the National Planning Board, now the National Resources Committee, as an agency of the Public Works Administration. What was then begun, partly in the form of national collection and study of available data and partly in the form of local investigations by the several states, did not fully crystallize, however, until more than a year later. In 1935, beginning with a group of monumental reports and leading on into the initiation of new lines of study, decisive progress was made and a nationally coordinated attack on the water resource problem may be said to have begun.

Powell and Roosevelt

Water study in the United States goes back fully half a century. That early work and the subsequent conservation campaign in fact constitute the essential background and motive of the present movement. To understand what is now going on, therefore, we must briefly survey the preceding activities.

In the eighties of the last century Major John Wesley Powell, of the United States Geological Survey, gave the first strong impetus to stream study. He was chiefly interested in the rivers of the West, where water is the prime necessity of life. His initiative led to the regular study of water by the Water Resources Branch of the Survey, and later, as the direct result of the work so begun and of the studies of Frederick H. Newell, to the enactment of the Reclamation Act in 1902.

Stimulated largely by the convictions and vigorous personality of Theodore Roosevelt, there followed in the decade 1902-1912 numerous conservation conferences, a few laws aimed at better regulation of water resources, and the awakening of public consciousness with respect to conservation of natural resources. Emphasis at this time was chiefly on prevention of waste and development of water for use; as these concepts were not conspicuously out of line with the opportunist thought of the time, they required little educational effort or popular support, except where public funds were to be spent to create irrigation enterprises in the West. Few streams had been so completely utilized as to give rise to serious conflict in use of their waters.

Integrated development

A decade later, however, and particularly in connection with the controversy over Muscle Shoals, a new idea began to evolve with respect to river improvement—integrated development of rivers for power, flood control and navigation. A result was the elaborate survey of the Tennessee River and its tributaries by the Army Engineers, authorized in 1922. This was probably the

most extensive river study ever made in the United States up to that time. State interest in water problems also made an active beginning in this period, particularly in California, where the rapidly growing population made heavy demands on the limited and unevenly distributed water resources. California inagurated a state-wide water resources investigation upon a scale never before attempted.

Between 1925 and 1932 a combination of natural events and regional desires for water projects served to focus public attention in all parts of the country upon large water problems. Among these were the undertaking of the Boulder Dam project and the associated discussion of the relation of the Colorado River to the seven states through which it flows; the Chicago drainage canal controversy; the St. Lawrence waterway and power project; the great floods of 1926 and 1927 in New England and on the Mississippi River respectively; the drought of 1930-31; and interstate disputes relating to public water supply for Boston and New York from tributaries of the Connecticut and Delaware Rivers.

One result of this new interest was action by Congress in 1927 directing the Army Engineers to conduct elaborate investigations upon all the principal streams of the United States, except the Colorado, with respect to irrigation, water supply, power and other water uses in addition to navigation. The resulting reports have been appearing at intervals as House Documents (the so-called "308" reports, from H.R. 308, 69th Congress, 1st Session), which contain valuable data on the rivers of the country. The study received tremendous impetus from the great flood in the Mississippi in 1927, which closely followed the Congressional authorization. In turn this flood led to the 1928 Mississippi flood-protection plan, which is significant because here for the first time the nation assumed the task and cost of flood control.

About this time there began to develop sporadic efforts for a greater degree of coordination in planning river improvements, and a recognition of the fact that many economic and social factors are involved. The severe crisis of the economic depression in 1932 and 1933 and its huge unemployment problem brought public-works construction into the foreground of attention, and this almost at once led to consideration of river development projects. At the same time the President made it part of his major program to initiate a thorough scientific study of water and land problems, not only as a temporary expedient but as part of long-time improvement planning in the interests of the national economy.

As a first result, three agencies were set up in 1934 to report on water resources:

a. The President's committee on water flow was constituted in response to a congressional resolution in February, 1934, and made a report (H.D. 395, 73d Congress, 2d session) two months later. In the short space of time available no new studies could be made, and the report is essentially a synopsis of engineering findings resulting from the "308" surveys plus general recommendations by certain federal agencies. It outlined ten major project basins as presenting regions having water problems of national significance. This report is important and useful as presenting an excellent digest of available planning data at the time, and as indicating the need for more extensive studies.

b. The Mississippi Valley Committee was established in September 1933 to prepare a plan for the use and control of water in the Mississippi Basin.

c. The National Resources Board was created in June, 1934, being identical with the National Planning Board, which it succeeded, except that several Cabinet members were added. It was directed to investigate and report upon practicable national policies for a planned development of the land, water and mineral resoures of the country, with particular reference to economic and social welfare. The report of the Board is discussed hereafter. The Board was reconstituted as National Resources Committee in 1935.

Conservation activities in 1935

During 1935 there have appeared five reports of major significance with respect to water resources control and conservation for maximum beneficial use.

1. The first is that of the Mississippi Valley Committe, made public the first of the year (reviewed in *ENR*, Jan. 3, 1935, p. 19). The report is notable for the integration given to the appraisal of the numerous problems in water resources development in the several major basins of the Mississippi's drainage area. It recognizes as no previous report has done the relationship of land use to water use, and the economic and social issues which must be faced and coordinated. It marks the first step in the development of a rational national water policy.

2. Second is the report of the National Resources Board, containing as Part III the report of the Water Planning Committee (of same membership as the Mississippi Valley Committe.) This report (*ENR*, Jan. 31, 1935, p. 169) constitutes a second logical step toward the evolution of a sound national water policy. It is chiefly devoted to an inventory of the water resources of the United States, the first ever published in this country. Analysis of this inventory by the Water Planning Committee leads to evaluation of major water problems in various parts of the country and a recognition that basic hydrological data and supplementary technical studies are so lacking in many regions as to preclude justification for the immediate construction of many projects.

Both this report and that of the Mississippi Valley Committee clearly recognize that study of our water resources from many points of view is a prerequisite for planned development, and that the data-collecting agencies of the government should be supported in providing a wider array of facts, as basis for sound programs of construction.

Because of the large amount of new material of a factual nature collected by the regional consultants in the preparation of this report, there were issued in June a series of volumes containing abstracts of the regional consultants' reports.

Reclamation policies studied

3. Also in January, 1935, there appeared the report of a special committee, J. W. Haw and F. E. Schmitt, appointed by the Secretary of the Interior to study present reclamation policies and to suggest desirable modifications (*ENR*, Jan. 31, 1935, p. 167) It is first of a series of reports (to which the next two also belong) which are now required to appraise, evaluate, and recommend concerning specific water undertakings of a national character. This report, which approves federal reclamation activities as a sound national program, is entirely in line with the recommendations of the two reports just mentioned in suggesting that new irrigation enterprises be undertaken only after cooperation with States and that project plans be developed on the basis of coordinated regional benefits. Two important corollaries are that prevention of overdevelopment of land beyond the capacity of the water supply is vital, and that power projects incidental to irrigation developments should conform to a national power policy.

4. In September, 1935, there was issued a report on Water Pollution by a special advisory committee of the National Resources Committee, appointed because of increasing public consciousness of the pollution of surface waters and the initiation of congressional action to attempt to supply a remedy. The report recommends *no basic changes* for the present in federal law with respect to water pollution control, but does advocate more extensive research by federal authorities. It points out that we need to establish standards of water quality for purposes other than domestic water supply (as, for bathing beach waters). It recommends the inclusion of water pollution control as a necessary part of all planned river developments, the strengthening of state laws, the provision of federal grants-in-aid to states and other public agencies, and the inauguration of a demonstration pollution control enterprise on the Potomac River on a comprehensive drainage basin scale to develop practicable interstate and federal-state programs and policies. This report (*ENR*, Oct. 10, 1935, p. 505)

forms a second step of a specific character toward the formulation of a national water policy.

5. In December, 1935, appeared the report of another special advisory committee of the Water Resources Committee, that on Specifications and Standards for Hydrologic Data. Although primarily charged with formulating procedures whereby emergency relief projects could be effectively used to collect, compile and publish hydrologic information, this committee undertook also to suggest standards and methods applicable to the regular data collecting agencies of the federal government. Certain of its recommendations have already been adopted.

Water Resources Committee

The Water Resources Committee just mentioned, consisting of the heads of seven federal agencies largely concerned with water problems, one state engineer, one state sanitary engineer, one geographer and two hydraulic engineers, has in addition to other work been largely responsible for the preparation of the two last-named reports and for three minor reports useful in water resources planning. The latter are "Studies of Water Resources Conducted by Various Agencies Under the Emergency Relief Program" (in Summary of Legislation Relating to Water Resources, 74th Congress, 1st Session), and "Manual on Water Planning Investigations for State Planning Boards."

Two other government reports compiled in 1935 should be mentioned, though published in 1936. These are Water Supply Papers 771 and 772 of the U. S. Geological Survey, "Floods in the United States," and "Studies of Relations of Rainfall and Run-off in the United States," both initiated at the request of the Mississippi Valley Committee and carried on with the aid of outside technical advisory committees. The first, which gives tables of flood events at some 200 river measurement stations throughout the country, contains important technical discussions and does much to promote sounder solution of flood problems. The rainfall-runoff report was initiated while the country was experiencing the severe drought of 1934. It presents a number of studies designed to evaluate certain of the complex factors entering into the relation between rainfall, run-off and ground water levels. Perhaps the report is as distinguished for the as yet insoluble hydrologic problems which it raises as for the significant results of the specific studies which it contains.

The National Resources Committee has also published reports on public-works planning and on land and minerals, which bear on water resources more or less directly. In conjunction with it, state and regional planning boards have published reports that include thorough consideration of water; numerous state water resources committees have contributed valuable compilations of basic data, inaugurated important local studies of water resources, and formulated long-range plans for water resources investigations and development. In the Pacific Northwest and in New England, regional planning boards are prosecuting large-scale investigations of water problems. Further, several states have established water control boards as a result of the impetus given by these studies.

"State Planning" and "Regionalism," recent publications of the National Resources Committe,, also have much to say of water problems, especially water pollution.

Soil conservation service

During 1935 the Soil Conservation Service was by congressional action constituted a permanent bureau in the Department of Agriculture. This new agency has undertaken a number of extremely significant investigations relating to water resources. In establishing elaborate experimental stations on a considerable number of small drainage areas in different parts of the country the Service has very properly considered water as the prime agent in erosion, and has set out to discover in scientific manner the relation of the several elements of the hydrologic cycle to erosion control and land use. Its well equipped experimental stations are carrying on (a) climatic and physiographic studies, (b) erosion control investigations, (c) watershed and hydrologic studies, and (d) sedimentation and hydraulic investigations.

Equipped with ample funds, staffed with competent personnel, enthusiastic as to its opportunities, this new bureau may well become the purely research and investigatory agency of the federal government in hydrologic activities that has long been sorely needed. It is to be hoped that it may keep within its present research field, coordinate its activities with the established data collecting agencies of the government, and develop a policy whereby its programs may be guided by advisory groups of specialists from within and outside of the federal service. Another year should witness accomplishments which will permit further appraisal.

Current activities

To the greatest extent possible, the Water Resources Committee is doing part of its work through outside boards. It is also soliciting the advice of national technical organizations on general policies or on studies tending to advance professional knowledge. The committee is charged with a continuing assignment to deal with water resources problems of national implication. Current activities include:

1. A study of major water problems in the arid states, preliminary to inauguration of selected regional or drainage basin investigations.
2. A survey of basis data essential in reaching an agreement for the equitable apportionment of the waters of the Upper Rio Grande Basin. This study, for which $200,000 has recently been appropriated, is being undertaken in cooperation with the states involved. The federal government has large interests in the region.
3. A report upon the Kansas City flood situation, in cooperation with local interests and the Corps of Engineers.
4. A study of drainage policies and projects of federal bureaus, to promote coordination and prevent conflicting programs.
5. A study of past and proposed expenditures by federal agencies for water resources investigations, with a view toward recommendations for an expanded and coordinated program.
6. An investigation of water problems in the Red River of the North drainage basin.
7. Publication of a digest of the functions and activities of federal agencies concerned with water problems.
8. Sponsorship of a card catalogue of pertinent data relating to all public water supplies in the United States.
9. A continuation of the studies of floods in the United States.
10. Developments of sound principles upon which national water policies may be based, prosecuted in cooperation with special committees of the American Society of Civil Engineers and the American Water Works Association.

Complementary to the above is an elaborate social and economic study being undertaken by the Bureau of Reclamation to determine factors related to the planned development of the Colorado River Basin.

Future trends and potentialities

Because of the noteworthy series of developments above reviewed, the year 1935 is likely to mark a significant epoch in the rational development of the water resources of the United States. By no means completely or even satisfactorily outlined as yet, nonetheless developments toward sound policies have advanced materially during the past year. Out of a welter of well intentioned attempts at national, state and local planning of every conceivable activity, there has definitely emerged a growing consciousness of the necessity for a national policy on water resources correlated with land use and economic and social aspects.

Successfully to attack the extremely complicated problem of water resources conservation, use, and control requires a far more comprehensive and scientific program than has thus far been formulated. Economic and social, as well as technical factors must be envisioned. The part which the federal government, the states, the local communities and the technical practitioner should respectively perform is one aspect of the problem, but the procedure whereby all of these elements may coordinate their separate and joint activities is more important.

It has already become clear that the technical and legal difficulties, of the water problem are not insurmountable. Accordingly, the increasing public response in the past three years to thoughtful promotion of water resources study makes the definite accomplishment of 1935 an event of high promise for the future. It may fairly be said that true conservation of the nation's water resources is at last in sight.

Weather and Water in 1935

DRAWING upon official observations of the Weather Bureau and the Geological Survey respectively, Montrose W. Hayes and John C. Hoyt summarize the chief facts of natural events . . . Rainfall conditions improved over preceding dry years . . . Streamflow and groundwater returned toward normalcy . . . Severe local high waters brought a renewed warning of flood dangers

WEATHER

MONTROSE W. HAYES
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COOLER and wetter weather prevailed in 1935 than in 1934, but at the same time the temperature was higher than in the average year, and the precipitation for the country as a whole was not unusual. The highest temperature reported in 1935 was 123 deg. F. at Cow Creek, Inyo County, Calif. The lowest for the year was 51 deg. below zero at Pine River Dam, Crow Wing County, Minn.; but Grantsburg, Wis., was a close second with 50 deg. below. The highest and lowest all-time temperature records in the United States are 134 deg. in Death Valley, Calif., and 66 deg. below zero in Yellowstone Park, Wyo.

Precipitation was above normal rather generally from the central Great Plains eastward, except in the lake region and the southeast. The southern half of the area west of the Rocky Mountains had nearly normal amounts for the year with a few localities showing above normal, the totals, in general, ranging from about 10 per cent below normal to 25 or 30 per cent above. The northern Great Plains had mostly from about 90 per cent of normal to slightly above normal, and parts of the Central Plains received considerably more than the normal amount.

On the other hand, an area comprising the north Pacific States, Idaho and Montana, and another, extending from southeastern Colorado and southwestern Kansas southward over the Panhandles of Oklahoma and Texas, and eastern New Mexico, continued abnormally dry, the annual falls ranging from about two-thirds of normal in western Texas to about three-fourths of normal in southwestern Kansas. Much of the far northwestern area had less than 60 per cent of normal, with some stations reporting less than half the normal amount.

Except very locally, the only section of the country having less precipitation in 1935 than in 1934 was the Pacific Northwest, while, on the other hand, large areas, especially the interior valleys and Great Plains (seriously dry in 1934) had approximately normal to considerably above normal precipitation in 1935. An outstanding feature of the year's weather was the persistent spring wetness in the interior valleys. At the end of 1935 the soil moisture was generally satisfactory over the eastern half of the country, but most of the western half still needed precipitation.

The rains in the late spring and early summer brought an end to the unprecedented dust storms that prevailed on the western plains in the first four months of the year. The immediate cause of these storms was, of course, dry weather, but the primary cause was largely not meteorological, and it would be out of place to discuss it here. It has been, and is still being, discussed at great length by agriculturists.

Destructive local floods

Outstanding rainstorms occurred in the basin of the Kansas River in southern Nebraska and Kansas, and in the basin of the Colorado River in Texas in June, in south-central New York and northeastern Pennsylvania in July, in the Muskingum Basin in Ohio in August, and in a small area around Houston, Texas, in December. The resulting floods either approached or exceeded the record high-water stages in small streams and caused immense damage.

The wind storms that stand out prominently in 1935 are the hurricanes of Sept. 2 to 4, and Nov. 4, in Florida. The first was a storm of phenomenal intensity over the Florida Keys; it established a new record (26.35 in.) for low barometer readings in the western hemisphere. In the path of the storm the bridges and roads over the passes between keys, and buildings on the keys were completely destroyed. These buildings were mostly of frame construction, and the attendant tide demolished those that withstood the wind. The November storm was not nearly so severe as the first; it was, however, noteworthy on account of its apparent origin and path. It moved in a westerly and southerly direction from Bermuda to the southern tip of Florida.

Nothing new in weather observations was developed in 1935, but a distinct advance in the use and treatment of the observations—both those made on the earth's surface and in the air from airplanes—was made. While observations from airplanes are not new, more have been made recently than ever before, and they are adding greatly to the knowledge of meteorology and are enabling forecasters to analyze air masses to an extent that was impossible when surface observations only were available; an improvement in weather forecasts will follow as a result. This improvement will not be fully realized immediately, as a period of study and adjustment is quite necessary, but a gradual advance is expected.

Some significant conclusions

The engineer is interested in the weather of every year in a statistical way, but printed annual reports and long tables of weather data have been available to him throughout his years of practice, and he is searching for something new, of a non-statistical character, something that will give him a grasp of underlying causes and will enable him to have a better understanding of the data he has had for so many years. It seems that 1935 has furnished several lessons that will aid in bringing about this understanding. One is an answer to the question frequently asked about the end of a long dry period. Does the end come suddenly, or does it come about gradually? In most instances the rainfall increases gradually, but in 1935 in large areas of the country a sudden end came to the protracted period of drought.

Then, the pessimistic feeling held by some that the climate was permanently changing and that some regions, formerly fairly well watered, would be semi-arid, has been proved unfounded. There have always been dry trends and wet trends, following each other, and probably always will be.

Also, the several rain storms of unusual severity show, when coupled with similar occurrences in other years, that perhaps no part of the United States is free from this phenomenon, but that similar storms are almost annual occurrences in widely separated parts of the country and result from an atmospheric pressure arrangement or condition that is particularly favorable to the production of excessive precipitation. They are not peculiar to the regions in which they occur, not even the extreme southwest is immune to them, although they are rare in any given locality.

The hurricanes of the year, and the unusually high tide that accompanied the one of Sept. 2-4, must have added to the

knowledge of the necessities in construction that will be adequate in regions subject to storms of hurricane intensity and to storms of less severity.

Earthquakes are not considered meteorological phenomena, but a mere mention that numerous and disastrous quakes occurred in Helena, Mont., the latter part of October and the first part of November is not out of place in closing this article.

WATER

JOHN C. HOYT
Hydraulic Engineer, Water Resources Branch, U. S. Geological Survey, Washington, D. C.

AFTER FIVE YEARS of widespread droughts, during which previous low records of both streamflow and groundwater levels were broken, water supplies during 1935 in most sections of the United States approached or exceeded normal. This was true also of Hawaii.

The mean annual flow of most streams was average or above in all but seven of the 31 humid states; noticeable low-water conditions were reported only for Connecicut, North Carolina, Ohio and Alabama, but except in Connecticut they were not severe enough to cause serious supply shortages. In the eleven arid states, with the exception of California and Washington, the flow was somewhat below the average; in the six semi-arid states it was above average except in North Dakota and South Dakota. In the arid and semi-arid states the principal shortages were in Nevada, Utah and the Dakotas. The proportion of electric power for public use in the United States produced by water during 1935, which may be considered a rough index to the flow of streams, was 10 per cent above normal.

Groundwater

In most parts of the country the lowering of lake, pond and reservoir levels, which had persisted since 1930, was checked, and in many areas the levels started to rise. The storage on Oct. 31, 1935, in the reservoirs of federal reclamation projects was materially greater than on the same date in 1934. There was a marked recharge of groundwater reservoirs in most states. It was greatest where the levels had been most lowered by the previous droughts, especially west of the Mississippi River, reaching 10 ft. in some localities. This indicates that groundwater recharge after drought periods is probably more rapid than has been believed heretofore.

Floods in which previous high flows were equaled or exceeded were reported in the Susquehanna River Basin in New York, the Muskingum and Hocking River Basins in Ohio, the Colorado and Nueces River Basins in Texas, and the Republican River Basin in Nebraska and Colorado. Floods of lesser severity were reported in Vermont, Massachusetts, Pennsylvania, Maryland, Virginia, Kentucky, Kansas and Washington.

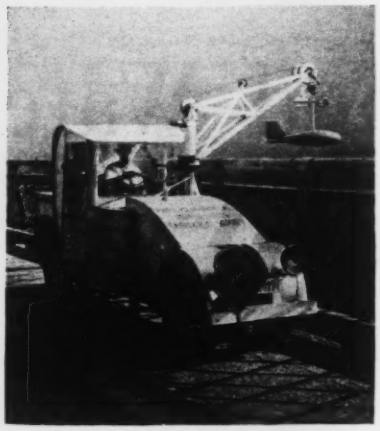


FIG. 1—POWER BOOM AND REEL for handling flow meter and weight in making stream measurements on Mississippi River.

Gaging facilities improved

Marked improvement in facilities for river measurement resulted from the completion in 1935 of the repair and replacement program for river-measurement stations made possible by emergency fund allotments and completed in 1935. In this work the development of hand and power booms and reels for handling the meter in making measurements of flow is an outstanding accomplishment. Many staff gages have been replaced by recorder wells.

Systematic collection of data on water supplies, carried on for more than 40 years by the United States Geological Survey, has now brought together so much information that most studies of water-supply problems can now be based on actual records instead of on assumptions, estimates and conjectures. Two comprehensive reports of data collected were published during the year: on floods (Water-Supply Paper 771) and on rainfall and runoff (Water-Supply Paper 772). A report on the droughts of 1930-34 (Water-Supply Paper 680) is now in press.

Certain facts of current importance are indicated by the rainfall and runoff studies:

1. The persistent downward trend in precipitation and runoff for the last two or three decades has been generally confined to (*a*) the northwest interior, the north Pacific coast, and the central Pacific coast areas; (*b*) the upper Mississippi Valley; and (*c*) the north Atlantic and middle Atlantic areas.

FIG. 2—WATER-STAGE RECORDER INSTALLATION on the Columbia River, Oregon, is an example of the latest type developed for accurate determination and recording of stream discharges.

2. The trend in annual precipitation during the decade ending 1930 was stationary or slightly upward in the southwest, Great Basin, northern and western plains, and Great Lakes areas, and rather decidedly upward in the south Atlantic and Tennessee River areas.

3. Since 1930 the precipitation in the northern and western plains area was decreased, while that in the north Pacific area has turned abruptly upward.

If there is anything to broad cyclic changes, upward trends in annual precipitation and hence in annual runoff may generally be shown in areas where the downward trend has been long and persistent, while stationary or downward trends may be shown elsewhere. A continuing upward trend in autumn precipitation should reflect itself in building up the groundwater lines lowered as a result of the widespread deficiencies in precipitation in the four years ending 1934.

HEADLINES OF 1935

Compiled from Current News Pages of Engineering News-Record

NEWS mirrors progress, and in 1935 there were recorded many significant events whose happening needs to be fixed in point of time if this progress is to be correctly evaluated.

From the following, the reader will learn that storage of water behind Boulder Dam was begun on Feb. 1, 1935; that the $4,880,000,000 relief-works bill was signed on April 8; that NRA was declared unconstitutional on May 27; and that it was July before the WPA was set up to supplement PWA in handling the relief-works expenditures. He will also note, to his regret, that the $400,000,000 highway and grade-separation program, ready to go in May, did not receive approval until Oct. 20. These and other happenings make 1935 a year to be remembered.

• JANUARY •

BID DEPOSITORY REGULATIONS for general contractors under the divisional code authority became effective in sixteen states.

RESUMPTION OF FEDERAL AID to states for highway construction marked, for the fiscal year 1935, by the apportionment of $185,000,000 by Congress.

CONSTRUCTION of first thirteen dams of Muskingum Valley Conservancy District begun by army engineers.

PRESIDENT ROOSEVELT in opening message to Congress declared government must quit relief business; his budget message proposed appropriation of $4,880,000,000 for work relief.

HAWK'S NEST POWER PROJECT, on New River, subject of suit filed in Supreme Court by Federal Power Commission against West Virginia, to determine jurisdiction.

MAPPING AND SURVEYING of entire country during next ten years recommended by National Resources Committee.

FEDERAL RECLAMATION in the West declared to be sound and desirable by Haw-Schmitt report.

I.C.C. control over highways and waterways proposed by Transportation Coordinator Eastman.

• FEBRUARY •

BOULDER DAM STORAGE begins on Feb. 1, eighteen months ahead of schedule.

RIPARIAN RIGHTS THEORY gives way to rule of reasonable water use in a decision by California supreme court.

SAN JACINTO TUNNEL construction taken over by Metropolitan Water District of Southern California, claiming unnecessary delay by the contractor.

TECHWOOD PROJECT, Atlanta, Ga., first of PWA low-rent housing developments put under construction.

BOULDER DAM concrete completed on Feb. 22, 21 months after concreting began.

TVA POWER SALES declared unconstitutional by Federal District Court Judge W. I. Grubb in Birmingham, Ala.

• MARCH •

GRADE-SEPARATION FINANCING affected by U. S. Supreme Court decision directing Tennessee supreme court to determine whether assessment of one-half of cost would burden the railroads and aid competing transportation.

MUNICIPAL POWER LOANS by PWA approved by federal court in St. Louis in injunction suit of Arkansas Power Co. v. Kennett, Mo.

EXTREME DROUGHT CONDITIONS cause severe dust storms in Western Great Plains region.

INTERIOR DEPARTMENT BUDGET increased $11,910,700 to provide for forest roads, mapping and stream-gaging.

SILICOSIS DAMAGE SUITS result in indictments charging the encouragement of such suits against two attorneys by an Iron County, Mo., grand jury; change of venue granted plaintiffs in New Kanawha Power cases in West Virginia.

PWA EXTENSION until July 1, 1937, effected by an amendment to federal relief-works measure; prevailing-wage amendment defeated.

HETCH-HETCHY DAM to be raised 85 ft. by PWA allotment of $1,058,000 to San Francisco.

SOIL EROSION SERVICE proposed as permanent bureau in bills offered in Congress; Service transferred from Interior to Agriculture Department.

BUFFALO ordered by state department of health to stop pollution of Niagara River.

ENGINEERING LICENSE ACT passed in the state of Washington.

• APRIL •

SHORTAGE of power-generating capacity forecast by Federal Power Commission.

ALL UTAH WATERS, both surface and underground, are made public property, subject to existing rights, by new state law.

PARKER DAM CONSTRUCTION impeded by new Arizona law prohibiting placing obstructions in navigable streams.

SILICOSIS and other occupational diseases made compensable by amendments to New York and North Carolina workmen's compensation laws.

DISMISSAL of Nebraska suit asking apportionment of North Platte waters between Nebraska and Wyoming refused by U. S. Supreme Court.

ENGINEERS' LICENSE ACT passed by Utah.

FEDERAL RELIEF-WORKS BILL signed April 8, and allocating of funds started.

ELECTRIFICATION of Pennsylvania R.R. from New York to Washington completed for passenger service.

WEST SIDE HOUSING PROJECT, Chicago, abandoned by PWA because of excessive land prices.

CONDEMNATION OF LAND by New York City Housing Authority for slum clearance upheld by state supreme court.

ENGINEERS' LICENSE ACT passed in Maine.

ENGINEERING PRACTICE by corporations limited in New York State by a law prohibiting formation of new engineering corporations.

WATER RIGHTS OF FARMERS' for direct irrigation held superior to storage rights by Colorado supreme court.

SMALLER PROJECTS expected to be chief reliance for speeding relief-works program as Division of Applications and Information, Allotment Division and Works Progress Division (later to become WPA) are set up.

• MAY •

PWA STATE ENGINEERS authorized to accept new applications for projects to speed up relief-works program.

PARKER DAM CONSTRUCTION declared illegal by U. S. Supreme Court, because of absence of proper authorization.

BUZZARD'S ROOST power project construction by Greenwood County, S. C., with PWA funds enjoined by federal district court.

CENTRAL VALLEY water-storage project in California subject of PWA study.

NEW JERSEY creates one-man road commission, to replace four-man commission.

FLOOD CONTROL and coast-erosion protection placed under newly formed Resettlement Administration.

EAST RIVER vehicle tunnel at New York City authorized by state legislature.

HIGHWAY AND GRADE-CROSSING PLANS for use of federal funds stated to be ready, and basis for allotments determined.

RULES for filing relief-works projects are announced.

NORRIS DAM abutment work halted by cave-in under west cableway track.

STATE PWA OFFICES set up to handle project applications.

RECLAMATION BUREAU project operation shifted from Denver to Washington.

RURAL electrification administration set up.

RIVER AND HARBOR WORK by army engineers alloted $102,186,500, as allotments are approved for first of relief-works funds.

HAWK'S NEST power jurisdiction suit of Federal Power Commission dismissed.

PASSAMAQUODDY power project construction in Maine undertaken by government under relief-works allocation.

WAGE RATES lower than those of the PWA established for relief-works program.

LIBERALIZED GRANTS AND LOANS approved for PWA projects; grant is 45 per cent as against 30 per cent formerly.

NRA CODES held unconstitutional by Supreme Court on May 27.

WISCONSIN coordinated works plan explained by Governor La Follette.

• JUNE •

RELIEF-WORKS PROGRAM delayed by disagreement over types of projects.

FLOODS in Republican River in Nebraska cause heavy damage and loss of life.

ALBANY, N. Y., power authority created by new law.

ROAD EXPENDITURES under relief-works program limited to $1,400 per man year.

PWA extended and enlarged under new executive order.

GRAND COULEE DAM changed in design from low power dam to base section of future high dam without provision for present power development.

WISCONSIN WORKS PLAN rejected by state legislature.

TABLE ROCK POWER PROJECT in Missouri denied extended construction time.

ENGINEERS' REGISTRATION LAW enacted in Connecticut.

HEAVY RAINS AND FLOODS cause extensive damage in southwest Texas.

OHIO RIVER locks and dams get $9,500,000 allotment.

EAST RIVER VEHICLE TUNNEL authority of three members appointed by New York City mayor.

CONNECTICUT authorizes bonds for Merritt Parkway work.

RULES for contract work-relief operations provide that 90 per cent of labor must be taken from relief rolls.

LOW-COST HOUSING FUND of $249,000,000 set aside for PWA by the President.

UPPER MISSISSIPPI RIVER CANALIZATION gets $51,495,000 for continuation; Lower Colorado River Authority in Texas gets $20,000,000 allotment.

WAGNER LABOR RELATIONS ACT passed.

• JULY •

TRI-STATE POLLUTION CONTROL participation provided by New Jersey law.

RELIEF WORKS divided between PWA and WPA, latter to take all projects below $25,000.

WORST FLOOD in seventy years caused by heavy rains in Finger Lakes and Chenango River areas, New York State.

FEDERAL CONDEMNATION OF LAND for housing held unlawful by U. S. Circuit Court of Appeals at Cincinnati.

PWA HIGHWAY and grade-crossing-elimination rules approved by President.

BUREAU OF RECLAMATION gets allotment of $100,000,000 from relief-works fund, for current year's work.

TVA POWER SALES declared legal by U. S. Court of Appeals at New Orleans.

• AUGUST •

RETIREMENT of ten acres of land for each acre reclaimed by Reclamation Bureau declared to be government policy.

MERRIMACK VALLEY sewage district for sixteen municipalities set up in Massachusetts.

CONCHAS EARTH DAM in New Mexico to be started by army engineers with $4,500,000.

MIDTOWN HUDSON RIVER TUNNEL at New York, holed through Aug. 20 two months ahead of schedule. Maximum monthly progress on the 32-ft.-diameter tunnel was 1,040 ft.

FARM-TO-MARKET ROAD PROGRAM adopted as feature of WPA operations.

HIRING of non-relief union labor permitted by Presidential order, modifying regulations requiring all labor to come from relief rolls.

DEADLINE of Sept. 12 set by President for applications for relief projects funds, and Dec. 15 set as last date for award of contracts.

MASSACHUSETTS plans to build 500 miles of highway sidewalks at a reported cost of $4,000,000.

• SEPTEMBER •

PARKER DAM WORK resumed as Rivers and Harbors Act gives authorization.

POWERS of TVA clarified in amendment to original law.

FLORIDA sea-level ship canal authorized, and $5,000,000 allotted for starting work.

USE OF PWA FUNDS for municipal power plants prohibited by injunction.

EMPLOYMENT RULES on highway and grade-crossing projects modified.

RIVER AND HARBOR WORK made permanent duty of army engineers by Rivers and Harbors Act of 1935.

PARKER DAM WORK has no funds provided for it in reclamation allotments.

CENTRAL VALLEY PROJECT in California to be started with $20,000,000 allotment to Bureau of Reclamation.

RIO GRANDE FLOOD CONTROL WORK in the lower reaches given approval in bill providing $4,743,000 for continuation of work.

WPA gets bulk of remaining relief funds to carry relief work through winter. PWA total reduced to about $900,000,000.

HIGHER MAN-YEAR COST on highway projects allowed by permitting states to underwrite portion of program.

ATLANTA, GA., votes bonds to finance contribution to WPA construction of 54-mile sewer system and five disposal plants.

NATIONAL LABOR RELATIONS BOARD sets up district offices and rules of procedure.

• OCTOBER •

CENTRAL NEBRASKA Public Power and Irrigation District gets PWA loan and grant of $10,000,000.

BOULDER DAM dedicated by President Roosevelt in talk commending engineers.

DEMONSTRATION PROJECT for regional control of stream pollution on Potomac River suggested by National Resources Committee in report on coordination of federal and state agencies.

SANTEE-COOPER hydro-electric project gets initial allotment of $500,000, to be carried out by South Carolina Public Service Authority.

RECLAMATION PROJECT allotments reduced by $20,000,000, including a $5,000,000 cut for the Central Valley project.

ARMY ENGINEERS ordered by President to take over engineering supervision of WPA work.

SHENANDOAH-GREAT SMOKY MOUNTAINS PARKWAY to be continued with $6,000,000 allotment.

ILLINOIS RIVER lock specifications require contractor to take relief labor to woods and quarries to obtain materials.

SETTING OF WAGE RATES on public buildings by Secretary of Labor held legal by courts.

RURAL RESETTLEMENT ADMINISTRATION announces suburban housing program costing $31,000,000.

PAN-AMERICAN highway bridge superstructures in Central America to be built by U. S.

APPROVAL OF $400,000,000 grade-separation and highway program finally given on Oct. 20 by President after series of postponements beginning in May.

EARTHQUAKES cause extensive damage at Helena, Mont.

PASSAMAQUODDY franchises and data obtained by government by agreement with Dexter P. Cooper, Inc.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS holds first annual meeting.

• NOVEMBER •

SEMINOE DAM CONTRACT in Wyoming rejected by contractor because of long delay in permission to start work and minor changes in labor regulations.

START of Sixth Ave. subway construction in New York foreseen by award of $5,000,000 contract.

WPA EMPLOYMENT DEADLINE advanced as program fails to meet quota.

QUEBEC ELECTRICITY COMMISSION of three engineers appointed by provincial government.

CENTRAL VALLEY PROJECT'S immediate construction made possible by revised plan approved by President.

ARIZONA FILES SUIT in Supreme Court for equitable apportionment of Colorado River water.

• DECEMBER •

NATCHEZ TRACE PARKWAY WORK in Tennessee and Mississippi to be started with an allotment of $1,500,000.

FEDERAL CONTRIBUTION to states for direct relief ended on Dec. 1.

DIFFERENTIAL in favor of domestic over foreign materials for PWA projects raised from 15 to 25 per cent.

CHICAGO'S OUTER DRIVE to be completed with $2,324,181 allotment by PWA.

GUNTERSVILLE DAM construction authorized by TVA.

DUMPING OF SEWAGE SLUDGE in Atlantic Ocean by New York City held no violation of previous garbage-dumping decree.

ENGINEERING CONTRACT for Buffalo, N. Y., sewers approved by PWA, ending long dissention in Buffalo Sewer Authority.

PUBLIC WORKS BILL for a $500,000,000 program will be presented to the next Congress, the administration announces.

BONDS for the construction of a rail-water terminal authorized in Bayonne, N. J.

SUTHERLAND, Columbus and Tri-County power projects in Nebraska economically unsound unless combined into single power marketing entity, according to engineers.

NATIONAL LABOR RELATIONS ACT held unconstitutional by federal court in Missouri.

MERRIMACK VALLEY sewerage district idea abandoned.

CURRENT NEWS

Railroad Terminal Unification

Unification of terminal facilities affecting sixty railroads in eleven cities is planned by Coordinator Eastman

UNIFICATION of railroad terminal facilities in eleven cities is expected to be definitely ordered by Coordinator Eastman shortly after railroad and labor regional coordinating committees, state authorities and shippers have been notified of the proposed changes. The orders will cover unification of terminal facilities of three railroads at Worcester, Mass., and Shreveport, Ill.; four at Ogden, Utah, and Grand Rapids, Mich.; six at Beaumont, Texas, Montgomery, Ala., and Jacksonville, Fla.; eleven at Des Moines, Iowa; eight at Council Bluffs, Iowa; seven at Meridian, Miss., and two at Mechanicville, N. Y. These projects, which are estimated as providing a saving of $800,000 to $900,000 a year, were selected from a survey of 5,000 terminal situations involving a yearly waste estimated at $50,000,000 by the Coordinator's staff.

In announcing his plan Coordinator Eastman asserted that "Public ownership is inevitable if private enterprise proves unable to do what the public interest requires. It is perfectly plain," Mr. Eastman asserted, "that if the railroads are to secure maximum traffic and revenues and furnish maximum employment, in the interest of shippers, travelers, investors and their own employees, they must be able to furnish at less expense much service which will be better than they now furnish, and charge less for it." These plans, according to the Coordinator, are not to consolidate the railroads into huge units or to stifle competition, but to enable the competing companies to cooperate to mutual advantage where their interests are common and where they are now working at cross purposes and duplicating services and efforts without reason.

Free Port Approved For New York Harbor

Approval of the establishment of a free port, or foreign trade zone, at Stapleton, Staten Island, was granted to New York City by Secretary of Commerce Roper on Jan. 29. The zone area will include five piers and about 18 acres of land. The city was also granted permission to construct a seven-story warehouse and manipulating building with a floor area of 1,196,685 sq.ft. at a cost of about $3,500,000. The complete development will cost about $4,600,000, including the warehouse, and under the terms of the grant construction must begin within 30 days and be completed within nine months. The city intends to have necessary barriers about the area erected and to have the zone ready for limited operation in about 90 days. This barrier would be a wire fence about 12 ft. high, with only one opening, and it is expected to cost about $30,000. Increase in the channel depth from 20 ft. to 35 ft. will be undertaken at once at an estimated cost of about $100,000. No federal funds can be used on this project, and the city will bear the entire cost.

Power Plant in Newfoundland Damaged by Severe Flood

A severe flood, due to ice jams, caused serious damage to a sluice gate of the Deerlake power plant of the International Power and Paper Co. near Cornerbrook, Newfoundland, on Jan. 26, and carried away part of a 4,000-ft. wood-stave pipe line. Company officials estimate that the main power plant will be out of commission for possibly a month. Damage was also done, by the flood, to embankments on the Newfoundland Ry., but this was repaired after only short delays.

New Bids on Montreal Intake Still Above Available Funds

When a second set of bids for the construction of the proposed new intake for the Montreal waterworks was opened on Jan. 29 it was found that the lowest bid was $1,685,000 or $485,000 more than the $1,200,000 that the city is authorized to spend for the work.

The new bids covered both manufacture and laying of from four to six lines of concrete pipe in a trench in the bed of the St. Lawrence River (*ENR*, Dec. 19, 1935, p. 849). The low bid on four pipes was submitted by the Northern Construction Co. and J. W. Stewart, Ltd. Last November the city received low bids totaling $1,818,856 on a combination of separate bids for manufacturing and laying the pipe. It has before it an unofficial proposal to do the work by tunneling within the specified limit.

Industrial Council Groups To Submit Reports

Industry Coordinator, George L. Berry, on Jan. 30, issued a call for the seven committees of the Council for Industrial Progress to meet in Washington on Feb. 10, to draft reports which will be submitted later to a full meeting of the Council for whatever action may be decided upon. The committees are studying the following subjects: national industrial policy: maximum work week, general wage and child labor; fair trade practices; internal and external competition affecting American standards; government competition with private enterprise; anti-trust laws and the Federal Trade Commission Act; financial aid to small enterprises.

Experts from industry and the government have been asked by several committees to appear.

Reclamation Funds In Supply Bill

Bill provides funds in excess of budget estimate; Gila Valley project resumed, and canal diversion plea denied.

Washington Correspondence

THE APPROPRIATION of $17,268,600 for the Bureau of Reclamation carried by the Interior Department Appropriation bill for the fiscal year 1937 is $2,196,500 more than the appropriation for the current year (1936) and $75,000 more than Budget Bureau estimates (*ENR*, Jan. 9, 1936, p. 65). The appropriation includes $1,168,600 from the reclamation fund, $9,600,000 for Boulder Dam and $6,500,000 for the All-American Canal. The balance between the sum carried by the Interior Department bill and the Budget Bureau's total for 1937 of $81,903,600 will be covered in a public works bill reappropriating emergency funds which have been allotted to the bureau. The increase in the bureau's ordinary appropriation includes additional funds for operation and maintenance charges on new land being brought under cultivation, the necessity for additional personnel and general expenses in the Washington office and the establishment of an operation and maintenance administration.

Provision for maintenance

This operation and maintenance administration was recommended by the House Appropriations Committee, which reported that, as the government has invested $250,000,000 in the construction of reclamation projects and projects are now under construction which will cost a like amount, the successful operation of this $500,000,000 investment will require an efficient administrative staff which will be in large part responsible for the collection of money due the reclamation fund as well as to protect the investment of the United States. This proposed agency will also be charged with the duty of advising and assisting settlers on the various projects as to the most profitable crops to be raised; the efficient and economical use of water; and in giving other information which will enable the water users to maintain a good standard of living and earn sufficient to pay operating costs and construction charges.

Gila Valley project resumed

Resumption of work on the $2,000,000 Gila Valley project in Arizona was ordered by Secretary Ickes, Feb. 3, after the Department of Agriculture withdrew objections to the reclamation development which resulted several months ago in an order by President Roosevelt suspending work. The Department of Agriculture at that time charged that the area included in the Gila Valley project was unfit for human habitation and virtually unsuited for most crops (*ENR*, Dec. 12, 1935, p. 833).

Ickes also announced, on Feb. 4, that the All-American Canal will be routed around Calexico, Calif., instead of through the city, thus carrying out recommendation of the

late Dr. Mead and denying the request of the city. Mr. Ickes stated that the decision was made by Charles West, Undersecretary of Interior. Local interests had asked that the canal be diverted through the city and had agreed to undertake the raising of the $1,000,000, estimated as being the added cost of the diversion.

Edward John Schneider, Bridge Engineer, Dies

Edward John Schneider, contracting manager of the bridge and structural department, Columbia Steel Co., a subsidiary of the U. S. Steel Corp., died Jan. 25 in Berkeley, Calif., at the age of 60.

He was graduated from the University of Illinois, College of Sanitary Engineering in 1900. Mr. Schneider spent almost his entire business life in the design, contracting for, and erection of fabricated steel structures, including highway and railroad bridges.

In 1907, Mr. Schneider went to San Francisco to become contracting manager, first for the American Bridge Co.; then for the U. S. Steel Products Co., and finally, with the Columbia Steel Co., in full charge of office and of all engineering, contracting and erection in the Pacific Coast territory. Among the bridges to come under his charge were the Carquinez Straits Bridge, the Southern Pacific Railway Bridge at Suisun, Calif., and the state highway bridge across San Francisco Bay between San Francisco and Oakland, now being completed.

He was past president of the Engineers' Club of San Francisco, past president, San Francisco Section, American Society of Civil Engineers, and was a member of the American Water Works Association, and Western Society of Engineers.

Army Engineers Get Allotment for Flood Control Survey

An allotment of $500,000 has been made by the PWA to the Corps of Engineers for surveys and investigations to determine the feasibility of the proposed Denison reservoir project in the Red River basin as part of a program for flood control, power and navigation development on the Red River. The proposed dam, located near Denison, Tex., would be 150 ft. high and would provide storage for 5,500,000 acre-ft. of flood water. It also would have an additional storage capacity available for power production.

The Red River basin has an area of 66,640 sq.mi. in Texas, Oklahoma, Arkansas and Louisiana. Much of the valuable land in this area suffers severe damages from periodic floods, of which there have been six during the past 40 years. By constructing dikes and drainage works the local authorities have provided partial protection from floods for approximately 600,000 acres of land. A detention reservoir, with the key reservoir being formed by Denison Dam, is required for complete control in the basin. The $500,000 allotment, which was made from old public works appropriations, will enable the engineers to make a detailed survey of the proposed site, with foundation investigations and preparation of detailed plans.

Construction League Meeting

Residential housing policies hold center of discussion at annual meeting of the Construction League in Washington as committee recommends government provide rental subsidy to low income group

ASPECTS of the construction industry's numerous contacts with the federal government were debated at the fifth annual general assembly of the Construction League of the United States, Jan. 29, in Washington, D. C. Residential housing monopolized attention, and Peter Grimm, coordinator of the administration's housing activities, indicated that President Roosevelt regards the responsibility for providing additional homes as resting chiefly on private enterprise.

The recent report of the Committee for Economic Recovery, suggesting methods of accelerating low cost residential construction, was explained by Thomas S. Holden, vice president of the F. W. Dodge Corp., and a member of the committee of which Allie S. Freed, president of Paramount Motors Corp., New York, is chairman.

F. Stuart Fitzpatrick, manager of the Construction and Civic Development Department of the U. S. Chamber of Commerce, discussed the findings presented in the report just issued by the Chamber's housing committee. This committee recommended that the federal government retire from the housing construction field and assist families in the lowest income group by a rental subsidy. Proposals to extend the Federal Housing Administration's modernization credit plan, which expires by statutory limitation on April 1, were discussed by H. C. Delzell, FHA's legislative representative. The assembly endorsed extension of the plan for another year and instructed the executive committee to take appropriate action.

Social security discussed

The application and extent of the Social Security Act was discussed by R. G. Wagenet, director of the unemployment compensation bureau of the Social Security Board. No reference was made by Mr. Wagenet to the proposal being considered by the board to adopt the construction project as a unit for basis of assessing the tax. If such a basis is not assumed the statutory provision exempting employers of less than eight persons would exempt a large proportion of the industry.

The assembly urged continuance of the government's highway construction program and opposed cancellation of the 1937 authorization of $125,000,000 for federal-aid construction. The executive committee was instructed to do everything in its power to defeat the Walsh bill that would subject contractors supplying goods and services to the federal government to regulation of wages and hours of employes.

Congressional committees suggested

A special committee is to be appointed for the purpose of promoting legislation to establish construction committees in both the Senate and House of Representatives. The League also will seek a larger appropriation than the present $10,000, for the Construction Economics Section established in the Bureau of Foreign & Domestic Commerce last Fall at the League's request. Lowell C. Chawner, chief of the section, outlined its aims.

The executive committee was authorized to submit to Congress, if and when the occasion arises, its conviction that no further extension of federal control over streams is desirable. This action relates particularly to any legislation to place control of water pollution under the federal government and was suggested by the American Water Works Association.

The following officers were elected for the year 1936: General chairman, R. H. Shreve, American Institute of Architects; first vice chairman, Malcolm Pirnie, American Water Works Association; second vice chairman, A. P. Greensfelder, Associated General Contractors; treasurer, J. C. Bebb, Producers' Council. New members of the policy committee are: William Stanley Parker, of Boston, for architects; Arthur S. Tuttle, of New York, for engineers; J. Boyd Griffiths, of Binghamton, N. Y., and Henry J. Ritter, of Buffalo, for subcontractors. The Institute of Boiler and Radiator Manufacturers was elected to full membership in the League.

Grand Coulee Contract Adjusted Because of Changed Plans

The Reclamation Bureau's contract with the MWAK Construction Company on the Grand Coulee Dam project has been adjusted on the basis of an agreement upon the probable cost of making changes in the design of the project as ordered June 6, 1935 (*ENR*, June 13, 1935, p. 861). The total cost is reduced from $63,000,000 to $60,000,000 by the elimination of the power plant construction and equipment, but the contract allows $7,000,00 more for other items, including $6,700,000 for additions to the estimates of common excavation at the site and of the amount of concrete to be placed in the dam. An increase from 11,000,000 cu.yd. to 14,400,000 cu.yd. of common excavation is due principally to slides occurring during excavation of the foundation. The estimate on concrete is increased from 3,100,000 cu.yd. to 4,200,000 cu.yd. as the result of the decision to build a high dam. Both items will be paid for at the unit price established by the orginal contract.

Florida Canal Uneconomic According to PWA

Administrator Ickes appeared, Feb. 4, before the Senate Commerce Committee investigating the Florida Canal, to testify that PWA turned the project down because it was not self-liquidating either as sea-level or lock canal. Mr. Ickes said PWA found it unnecessary to decide on the possible groundwater effect since the economic objection was preponderant. After Mr. Ickes left, Senator Vandenburg read into the record letters from eleven of the principal Gulf shippers, including all the major oil companies, to the effect that the canal is not justified and few vessels would use it even if it were toll free.

Approval Given New York Subway Contract

The Board of Estimate of New York City on Jan. 28 voted formal approval of a contract for the construction of the first section of the Sixth Ave. subway. A bid of $5,583,768 was accepted in November from the Rosoff-Brader Construction Corp., for construction of this section which will extend through the congested underground area from 40th to 47th St. (*ENR*, Nov. 7, 1935, p. 652.) Formal award of the contract at that time was delayed pending efforts to secure the demolition of the present Sixth Ave. elevated transit line in order to reduce the cost of construction. To date, however, such efforts have not met with success and the construction will proceed with provision being made to underpin the present elevated structure.

Bills of Engineering Interest Introduced In Congress

Numerous amendments to the Home Owners Loan Act are being presented in the present session of Congress. One by Rep. Ellenbogen, of Pennsylvania, proposes to reduce interest rates to 3½ per cent and to increase the time of maturity to 25 years. Another by Rep. Barry, of New York, would extend to April 1, 1937, the payment of any installment of principal now due.

Rep. Collins, of California, suggests an engineering survey of the Palo Verde and Cibola valleys of the Colorado River to determine how lands may best be protected from overflow. Rep. Monaghan, of Montana, proposed an amendment to the TVA act as follows: "Federal judges are forbidden to declare this act of Congress unconstitutional." His amendment also states that "the passage by Congress of this act is to be deemed conclusive presumption of its constitutionality." Rep. Dempsey, of New Mexico, proposes the extension for another year of the temporary relief granted water users on irrigation projects operated under the reclamation act. Other new bills that in some way affect the interests of engineers are constantly appearing before Congressional committees.

Contract Awarded for Tunnel Ventilation Building

Contract for the construction of the east ventilation building for the Hudson Midtown Tunnel has been awarded by the Port of New York Authority to the Cauldwell-Wingate Co. on a figure of $347,350. The building will be erected at the bulkhead line of the Hudson River at W. 39th St. The superstructure will consist of a steel frame with brick exterior walls, sandstone trim and granite-faced concrete base. It will be 145 ft. above the street level and will include a superstructure of 6 stories, 53x63 ft., and will have three additional floors in the ventilation shaft. Contract for 64 land borings, to determine the subsurface conditions along the approach line to the New Jersey portal of the tunnel was awarded to the Standard Drilling Co., Brooklyn, N. Y., at a figure of $7,588.

Double-Decked Roadway Through Yerba Buena Island

Double-deck tunnel through Yerba Buena Island, connecting the two sections of the San Francisco-Oakland Bay Bridge, carries six lanes of high speed traffic on the upper level. On the lower level space is provided for three lanes of truck traffic and a two-track railway. Photo shows the viaduct leaving the east portal of the tunnel, which is one of the largest in the world, and leading out toward the main 1,400 ft. cantilever span across the East Channel. The tunnel is 79 ft. at the spring line, and 540 ft. long (*ENR*, Jan. 23, 1936, p. 111). Feeder roads are being constructed to serve the island which was hitherto inaccessible except by boat.

Curtailed Public Works Favored in Canada

The Canadian Construction Association recommends that federal government cut its expenditures to normal

The Canadian Construction Association closed another successful annual meeting at Hamilton, Ontario, on Jan. 23, a registration of 470 making the meeting one of the best attended ever held. F. G. Rutley, of the Foundation Company of Canada, Montreal, was elected president, succeeding W. H. Yates, of Hamilton. All parts of the Dominion, from Sherbrooke in Quebec, to the Pacific coast, were represented, the Maritime Provinces alone being unrepresented.

Housing, accident prevention, and public works were focal points for discussion. Accidents were considered in a paper by P. N. Gross, of Toronto, who pointed out that $5,000,000 had had to be expended in the last seven years, through the Workmen's Compensation Act of Ontario as compared with only $7,000,000 for the thirteen years preceding. Methods for developing accident prevention figured largely in the ensuing discussion.

Public works were referred to by Mr. Yates, in his presidential address, and he stated that only $27,000,000 had been expended by Nov. 30 last through both the 1934 and 1935 Public Works Construction Acts of the federal government. Later in the meeting, the following resolution was passed:

"Extension of Public Works Program—The association, after careful investigation, recognizes the benefits received by the various branches of our industry from the operation of the Public Works Construction Act, 1934, and the Supplementary P.W.C.A., 1935. The expenditure under these acts by various government departments has resulted in employment not only to skilled and unskilled labour on the jobs, but has extended to the factories where much of the material is manufactured. In some centres, had it not been for this government work, there would have been little or no construction work undertaken.

"Recognizing, however, that the federal government undertook this work to provide a stimulus and encouragement to private industry, we believe that on the completion of the present program, including the contracting for the balance of the money voted, the operations of the federal government in the field of public works might well be limited to what might be considered normal appropriations."

Mississippi Plans Extensive Highway Program

A law providing for a highway construction program at a cost of $40,000,000 has been passed by the legislature of the state of Mississippi and signed by the governor. The bill requires the state highway commission to complete the state trunk highways and to commence other roads in the system according to their importance. The program will be financed in part by PWA funds, federal-aid highway funds and state funds derived from the 6-cent gasoline tax. The measure provides for a $23,000,000 bond issue, secured in principal and

interest by use of 1½ cents of the 3½ cents allotted to the state from the 6-cent gasoline tax. In addition to the $40,000,000 provided for in the bill, there will be a total of $5,576,000 allotted from federal-aid sources and from emergency appropriations for elimination of railroad grade crossings, making a final total available of $45,576,000. Other highways on the $80,000,000 designated system are to be paved under a program expected to be offered at the 1938 legislature.

As parts of most of these roads are already paved, the program calls for improving only certain sections of each road. As finally enacted, the measure calls for the construction of 1,300 miles of concrete and 400 miles of asphalt-paved road. The law carries authority for state officials to begin immediate work, and it is expected that advertisements for the work will be published in the near future.

SOCIETY CALENDAR

AMERICAN CONCRETE INSTITUTE, annual meeting, Chicago, Ill., February 25-27.

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES, annual meeting, Atlantic City, N. J., February 12-14.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY, Minneapolis, February 20-21.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES, Minneapolis, February 21-22.

SOUTHWEST ROAD SHOW AND SCHOOL, Wichita, Kan., February 25-28.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of committees, March 2-6.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Lafayette, Ind., April 7-9.

MIDWEST POWER ENGINEERING CONFERENCE, Chicago, Ill., April 20-24.

NATIONAL SAND AND GRAVEL ASSOCIATION at its annual meeting in St. Louis, Mo., Jan. 30, elected the following officers: ALEX FOSTER, JR., president; J. R. HILL, vice-president; H. S. DAVISON, secretary-treasurer.

NATIONAL CRUSHED STONE ASSOCIATION at its annual meeting elected the following officers: president, H. E. RODES; regional vice-presidents, C. M. DOOLITTLE, Hamilton, Ont.; E. EIKEL, New Braunfels, Tex.; A. S. LANE, Meridan, Conn.; J. A. RIGG, Fort Spring, W. Va.; N. E. KELB, Indianapolis, Ind.; T. I. WESTON, Columbia, S. C.; A. J. WILSON, Watsonville, Calif.; PORTER W. YETT, Portland, Ore.

Personals

RICHARD PARK, lieutenant colonel, Corps of Engineers, has been assigned to duty at Pittsburgh as district engineer.

WELLINGTON DONALDSON, formerly with Fuller & McClintock, consulting engineers, New York City, has been appointed sanitary engineer in charge of sewage treatment operations for the bureau of sewage disposal and intercepting sewers by the New York City Department of Sanitation. Mr. Donaldson has been given charge of the operation of 14 sewage treatment plants, including the new Coney Island sewage treatment works, involving chemical precipitation, sludge digestion and sludge filtration. In addition, Mr. Donaldson will also advise the department on sanitary features of new plants.

F. A. TORKELSON, city engineer of Wauwatosa, Wis., has been appointed chief engineer for PWA projects in the Virgin Islands. He was city engineer of Wauwatosa from 1916 to 1919, following which he was city engineer at Green Bay, and Marquette, Mich., and county engineer at Saulte Ste. Marie. Prior to his appointment as city engineer of Wauwatosa in 1934 he was an engineering contractor.

NORMAN HEBDEN, assistant engineer in Washington office of U. S. Bureau of Public Roads, in the engineering administrative department on state highway planning surveys, has been made assistant director of the Joint Secretariat of the American Society of Municipal Engineers and the International Association of Public Works Officials. Mr. Hebden was graduated in civil engineering from Cornell University in 1929, spent some time in industrial work including 2½ years in the production department of the Western Electric Co. From 1932 to 1934 he took highway graduate work at Johns Hopkins during which time he made a photographic study of highway capacities.

F. H. FRANKLAND has become chief engineer of the American Institute of Steel Construction, succeeding the late Lee H. Miller. Mr. Frankland is in charge of technical research and development, in addition to his other duties. He joined the Institute in 1928, and was placed in charge of the organization and operation of the Institute's district offices and engineering service. Prior to that he was structural engineer for Dwight P. Robinson & Co.; vice-president and chief engineer of Bancroft-Jones Co., steel constructors, of Buffalo. He practiced in New York City as a consulting engineer on the design and construction of steel bridges and buildings for two years, and also served with Waddell and Hardesty, consulting bridge engineers.

A. J. HAWKINS, for many years city engineer of Birmingham, and more recently connected with WPA, has been elected director of the Alabama state planning board, which was recently created by the state legislature.

ALBERT A. ROSS, superintendent of the water and sewer department, Lexington, Mass., has tendered his resignation which became effective Feb. 1, 1936. Mr. Ross was appointed acting superintendent of the water, sewer and street departments in 1923 and shortly after, at his own request, was released from duty with the street department and made permanent superintendent of the sewer and water department. After his resignation becomes effective, Mr. Ross will take up his duties as vice president and treasurer of Anthony Ross & Son, contractors.

R. J. McMAHON, technical assistant in the Texas state reclamation department since 1929, has been appointed state reclamation engineer to succeed ASHLEY G. CLASSEN, who resigned to become superintendent of the El Paso Water Department. Mr. McMahon was graduated in civil engineering in 1925 from the University of Texas. For a year he was on the Medina irrigation project and for a short time in municipal work in San Antonio. Mr. Classen is a graduate in civil engineering from the University of Kansas. His experience included work for Meyers, Noyes and Forrest, consulting engineers, Dallas, and E. P. Arneson, San Antonio, and PWA district supervising engineer for west Texas.

DOUGLAS S. ANDERSON, dean of the engineering school and acting president of Tulane University, has been elected an honorary member of the Louisiana Engineering Society. Honorary membership was conferred upon Dr. Anderson at the society's annual meeting in January.

Obituary

DANIEL S. HOSBROOK, civil engineer and surveyor, died Jan. 27, at his home in Montgomery, Ohio. He was 92 years of age. Mr. Hosbrook had served Hamilton county as engineer and surveyor and had been engineer for fifteen villages in Hamilton County.

JOHN A. KLING, president of the Cleveland Builders Supply Co., died Jan. 31 from bullet wounds inflicted by a former chauffeur. Mr. Kling began his career in Cleveland in the early part of this century and in 1908 organized the Cleveland Builders Supply Co., of which he became president. Since his acceptance of the presidency of the building supply company he has been a well known figure in the building industry.

ROBERT BROOKS MORSE, 55, chief engineer of the Washington Suburban Sanitary Commission, and prominently identified with engineering work in Maryland and elsewhere for many years, died Jan. 31 in Washington. His home was at Hyattsville, Md. Mr. Morse, after finishing his schooling at the University of Maine and Massachusetts Institute of Technology, became connected with the Baltimore Sewerage Commission in 1905. He was made division engineer of the commission later. Following this he became assistant sanitary engineer of the New York Metropolitan Sewerage Commission and in 1912 returned to Maryland to become chief engineer of the Maryland Department of Health. He continued in that post until 1922 but in 1918 also became chief engineer of the Washington Suburban Sanitary Commission. Mr. Morse also served on numerous other engineering bodies, including the New Annex Advisory Commission, Baltimore, in 1919; the Annapolis Sewerage Commission in 1920; the Maryland National Capital Park and Planning Commission in 1927; the Regional Water Supply and Sewerage Commission of the National Capital Park and Planning Commission in 1929 and 1930, and others. He belonged to numerous organizations, including the American Society of Civil Engineers, Maryland Water and Sewerage Association, and American Public Health Association.

JOHN A. MORTON, former commissioner of public works and city engineer of Santa Monica, Calif., died Jan. 29, at the age of 74. His first engineering service was with the Southern Pacific R.R. and with the state engineer's department. He spent some time in engineering work in Mexico and

Central America. He had been in the service of the city of Santa Monica for 30 years.

WILLIAM HENRY COBB, 79, for 23 years superintendent of the Jacksonville, Ill., water system, died there on Jan. 4. Mr. Cobb was born in Scarborough, England, and after coming to America was engaged in railroad work for 40 years. He was later connected with the water department of Jacksonville from 1910 until 1933.

C. HARRY ROGERS, president of the Rockport, Mass., Granite Co. until his recent retirement, died at his home, Jan. 12. He had been president of the American Granite Manufacturers Association. At the time of his death he was president of National Building Granite Quarries Association and treasurer of the Granite Paving Block and Curb Corp.

EDWIN W. GOESER, vice-president and production manager of the Emsco Derrick and Equipment Co., Los Angeles, Calif., died Jan. 21. He was 53 years of age. A graduate of Cincinnati Technical College, he came to Los Angeles in 1905 and became associated with the Pacific Electric Railway Co. He later joined the Union Tool Co. and subsequently the Emsco Derrick and Equipment Co. Mr. Goeser pioneered in the development of heavy duty rotary oil well drilling equipment.

BOYD ANDERSON, for the past twelve years connected with the Allis-Chalmers Mfg. Co., at Los Angeles, Calif., died suddenly Jan. 18 at his home in Alhambra, Calif. He was 43 years of age. Mr. Anderson, who recently had been appointed Los Angeles district manager for the company, after serving for several years as sales engineer, formerly was connected with the Crocker-Wheeler Co. in San Francisco. He was born in Maryland, lived for some time in Denver, Colo., and entered the electrical industry in San Francisco.

CONSTRUCTION STATISTICS OF THE WEEK

ENGINEERING construction awards are slightly higher this week due principally to heavier federal awards. The values are: total, $50,036,000; private, $14,257,000; public, $35,779,000; of which federal is $6,223,000 and state and municipal, $29,556,000. Corresponding values a year ago are: total, $17,237,000; private, $5,102,000; public, $12,135,000; of which federal was $2,515,000 and state and municipal, $9,620,000.

Increased volume is recorded this week in waterworks at $3,229,000, in industrial buildings at $8,756,000, and in earthwork, irrigation and waterways at $2,049,000. Lower values for the week are reported in sewerage at $5,683,000, bridges, at $1,856,000, commercial buildings at $1,725,000, public buildings at $13,691,000 and streets and roads at $5,588,000.

The larger contracts for the week include: stamping plant, Fisher Body Corp., Div. General Motors Corp., Grand Rapids, Mich., $7,000,000; pipe mill, Republic Steel Corp., Youngstown, Ohio, $500,000; Eastern High School, Baltimore, Md., $1,342,000; three schools, Philadelphia, Pa., $1,938,000; Federal Reserve Bank Building, Washington, D. C., $3,484,000; highways, by New Mexico, $640,000; by Montana, $909,000; by Ohio, $492,000; bridges by New York, $430,000; centrifugal pumps for main pumping plants, Colorado River Aqueduct, Metropolitan Water District, Los Angeles, Calif., $563,000; Iron Mountain pumping plant, Metropolitan Water Dist., Los Angeles, Calif., $719,000; Southwest Side intercepting sewer, contract 5, Chicago, Ill., $1,579,000; Alamogordo Dam, Carlsbad Project, Bureau of Reclamation, Fort Sumner, N. M., $1,133,000; steel rails, 16,000 tons, Chicago, Northwestern Ry. Co., Chicago, Ill., $600,000; rail and track materials for 1936, work by day labor and separate contracts, New York Central R.R., New York, N. Y., $2,593,000; improving East Boston Airport, Boston, Mass., $2,500,000.

State and municipal bond sales for the week total $7,173,000 and corporate security issues, $8,756,000. Federal loans brought the new capital total for the week up to $16,714,000. The volume to date is $178,820,000 compared with $31,175,000 for the first six weeks of last year.

CONTRACTS

(Thousands of Dollars)

	Weekly Average Feb. 1935	Prev. 4 Weeks	Week Feb. 6 1936
Federal Government	$2,241	$12,767	$6,223
State and municipal	9,660	39,795	29,556
Total public	$11,901	$52,562	$35,779
Total private	5,121	10,391	14,257
Week's total	$17,022	$62,953	$50,036
Cumulative to date: 1935...$165,501,000		1936...$338,583,000	

NEW PRODUCTIVE CAPITAL

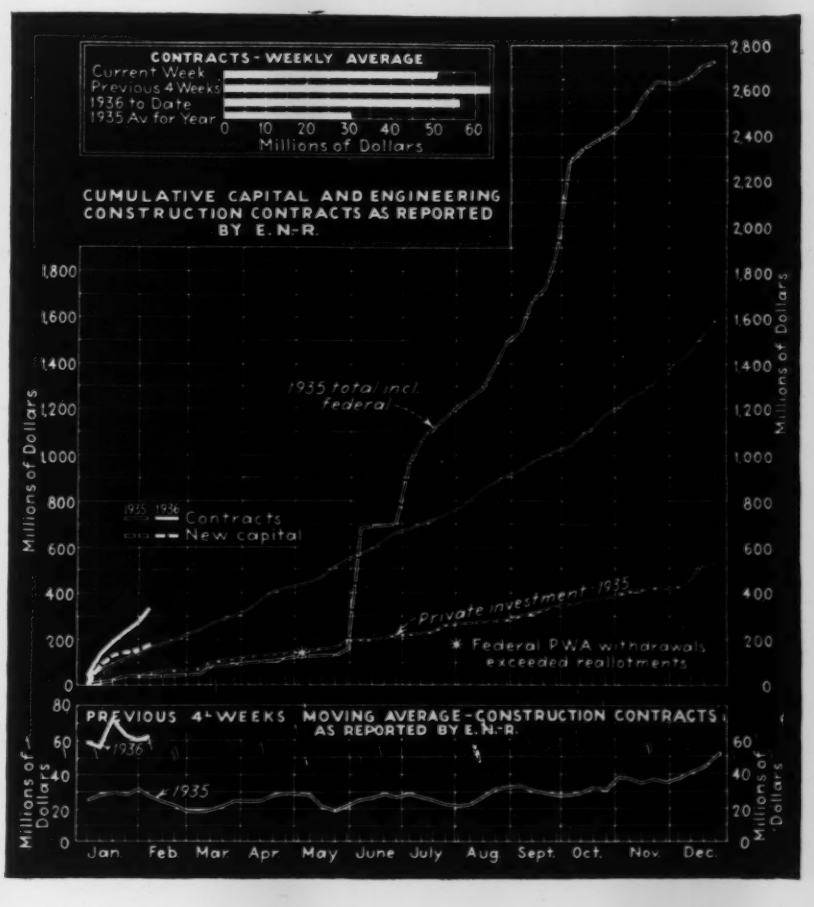
(Thousands of Dollars)

1936	Week Feb. 6	Cumulative
State and municipal	$7,173	$56,911
PWA non-federal	500	66,253
RFC loans	.....	25,000
Corporate issues	8,756	25,741
PWA loans	285	1,110
Total Non-Federal	$16,714	$175,015
Federal	.....	3,805
Total new capital	$16,714	$178,820
Cumulative to date: 1935...$31,175,000		1936...$178,820,000

Note: These figures include private bonds and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Feb., 1936	200.20	96.23	Jan., 1936	248	109
Jan., 1936	199.48	95.89	Dec. 1935	254	111
Feb. 1935	196.02	94.22	Jan. 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E. N-R.
1935 total incl. federal
1935 1936 Contracts
New capital
Private investment 1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4 WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1936
1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT (per bbl., carload lots, including 40c. per bbl. for bags, cash discount not included)			SAND AND GRAVEL (per ton, carload lots)			CRUSHED STONE (per ton, carload lots)		CRUSHED SLAG (per ton, carload lots, f.o.b. plant)		CONCRETE
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Ready Mixed 1:2:4, 50c. yd. or more, delivered
Atlanta	$3.02	$2.79	$2.50	$2.31	$2.31	$1.64	$1.69	$1.92	$1.80	$1.80	$8.50
Baltimore	2.69	2.44	2.24	1.80‡	1.80‡	1.30‡	1.80‡	1.80‡	1.80	1.80	7.25
Birmingham	2.40	2.15	1.95	1.80	1.80	1.45	1.00	1.00	.90	1.15	5.45
Boston	2.42	2.17	1.92	1.40	1.40	.90	1.40	1.40	.....	.....	6.50
Chicago	2.75	2.50	2.40	1.57	1.57	1.44	1.88	1.88	.....	.....	.....
Cincinnati	2.50	2.25	2.05	1.20	1.20	1.30	1.80	1.80	.....	.....	6.70
Cleveland	2.41	2.16	.....	1.40	1.40	1.30	1.60	1.60	1.75	1.75	7.05
Dallas	2.45	2.20	2.00	1.55	1.55	1.30	2.10	2.25	.....	.....	7.00
Denver	3.09	2.84	.....	1.20	1.40	.90	.....	.....	.....	.....	.....
Detroit	2.26	2.01	1.81	1.30	1.30	1.20	1.40	1.60	1.40‡	1.50‡	6.75
Kansas City	2.51	2.26	2.06	.....	1.85	1.25	1.85	1.80	.....	.....	7.65
Los Angeles	2.25	2.05	.....	1.40	1.40	1.00	1.40	1.40	.....	.....	6.31
Minneapolis	2.90	.....	2.45	1.00[p]	1.00[p]	.25[p]	1.00[p]	1.00[p]	.....	.....	6.85
Montreal	.....	1.70	.....	.85	.90	1.25	.85	1.20[p]	.....	.....	4.50
New Orleans	2.47	2.22	2.00	1.75	1.75	1.45	.....	.....	.....	.....	8.25
New York	2.60‡	2.35‡	.....	1.40†[k]	1.40†[k]	.75†[k]	1.75†[k]	1.85†[k]	.....	.....	8.00
Philadelphia	2.63	2.38	2.18	1.35‡	1.45‡	1.05‡	2.60‡	2.75‡	1.00‡	1.00‡	7.75
Pittsburgh	2.46	2.21	1.61	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.50	1.50	7.00
St. Louis	2.53	2.28	.....	1.40‡	1.40‡	1.40‡	.75[p]	.75[p]	.65/.95§	.50/.95§	6.65
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	3.09	2.84	.....	1.00	1.00	1.00	1.44	1.44	.....	.....	7.56

*10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. [k]Barge lots alongside dock. [p]f.o.b. plant. [t]5 tons or more. [u]Within 3-mi. from Pub. Square. [t]ton. [d]25c. discount for cash.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich.	$1.50	$1.45	Ironton, Ohio	$1.50	$1.45	North Birmingham, Ala.	$1.75	$1.70
Buffington, Ind.	1.70	1.65	Iola, Kans.	1.70	1.65	Richard City, Tenn.	1.85	1.80
Crestmore, Calif.	1.72	.....	La Salle, Ill.	1.70	1.65	Saginaw, Mich.	1.50	1.40
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind.	1.70	1.65	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.70	1.65	Mason City, Ia.	1.70	1.65	Universal, Pa.	1.65	1.65
Hudson, N. Y.	1.75	1.70	Norfolk, Va.	1.76	1.71	Waco, Tex. (Inc. 5c. Tax)	1.80	1.70
Independence, Kans.	1.70	1.65	Northampton, Pa.	1.65	1.60	Wyandotte, Mich.	1.45	1.45

Cash Discounts, Cement, to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount, 10c. per bbl. for payment within 15 days of date of invoice.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED (Per M, lots of 2,000 pieces or over)			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED (Per M, lots of 2,000 pieces or over)			BRICK (Per M, in quantity)		LIME		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Per ton, Hydrated finishing	in paper, Common hydrated	carload lot, Pulverized or lump
Atlanta	$75.80	$80.80	$151.60	$181.90	$212.20	$242.50	$14.25	$14.25	$24.00	$17.00	$15.90
Baltimore	91.00	98.00	183.00	219.00	315.00	390.00	13.00	17.00	16.00	12.50	18.50
Birmingham	78.75	84.00	157.50	189.00	201.25	242.00	15.00	19.00	2.50§	1.50§	2.00§[e]
Boston	84.40,[t]	90.00,[t]	168.75,[t]	191.25,[t]	246.75,[t]	282.00,	14.50	18.00	20.00	15.50	3.50[e]
Chicago	66.00	70.40	132.00	168.65	196.75	224.85	10.20	11.20	18.00	13.40	14.00
Cincinnati	55.00	58.70	110.00	124.10	164.20	187.70	17.50	17.50	15.97	12.48	.....
Cleveland	45.00	48.00	90.00	108.00	138.50	158.50	13.00	13.00	16.00k	14.00k	2.65k[p]
Dallas	72.00	75.00	149.00	177.00	217.00	269.00	13.50	26.00	21.20	14.50	1.70[p]
Denver	78.50	88.00	141.50	166.50	196.00	225.00	10.50	15.00	30.00	22.00	22.50
Detroit	71.85	76.65	143.70	230.00	280.00	325.00	11.50	12.50	14.25	11.90	22.20
Kansas City	72.50	75.50	92.00*	140.50	177.75	207.25	15.00	24.00	18.00	11.89	14.20*
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	80.15s	85.50s	145.40s	167.75s	175.25s	243.70s	13.10	15.10x	25.50	21.00	23.00
Montreal	79.10s	90.40	169.50s	.....	212.40	136.60	20.75	31.00	15.00	10.00	7.00
New Orleans	61.50	65.10	123.20	157.00	195.00	.....	13.75	.....	16.75	13.00	.....
New York	84.00	90.00	135.00*	193.30†	238.80†	295.60†	10.00	.....	20.00	15.50	20.00
Philadelphia	76.00	80.00	150.00	172.00	240.00	295.00	18.00	20.00	16.35	11.25	10.75
Pittsburgh	58.40c	62.30c	116.85c	165.00c	217.00c	250.00c	16.50	25.00	17.20	14.50	2.22[p]
St. Louis	62.00	65.00	120.00	180.00	234.00	280.00	15.00	18.00	.55‡	.40‡	2.30[p]
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.50	21.50	2.05[p]
Seattle	86.00	94.50	210.00	198.00	.....	.....	15.00[d]	18.50	30.00	26.00	3.00[p]

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl., 200 lbs. [p]Per bbl. 180 lbs. [e]per bbl. 280-lb. kLCL. [d]less $1 cash 15 days. *lump. [s]Smooth. xSelected common. [t]Carload lots delivered to job.

ROAD SURFACING MATERIALS—F.O.B. CITY

	PAVING BRICK AND BLOCKS			PAVING ASPHALT (Per ton, less than 80 penetration)		ASPHALT BINDERS—FLUXES (Per gal., 80-300 penetration)		CUTBACK ASPHALT (Per ton)		ROAD OILS (Per gal.)		ASPHALT EMULSION (Per gal.)	
	Granite per M. lots of 50,000, 4x4x8 in.,	Brick per M., 3x4x8½ in., carload lots	Wood per sq.yd., 3½ in., 16-lb. treat,	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Tank car	Drum
Atlanta	$ 75.00	$35.00	$2.25	$18.20[z]	$23.41[z]	$0.728[z]	$0.999[z]	$19.20[z]	$27.22[z]	$0.668[z]	$0.085	$0.085	.....
Baltimore	110.00	44.00	2.25	17.00	22.00	.075	.10	.09†	.125†	.....	.....	.....	.....
Birmingham	110.00	25.00	....	19.00	24.00	.0878	.1128	.10†	.137†	.....	.06	.....	.125
Boston	75.00	28.00	2.50	17.00	22.00	.07	.095	.09†	.12†	.07	.095	.125	.....
Chicago	125.00	42.00	2.60	15.00	19.00	$13[3]	$14[4] 18.00	.07	.11	.05	.....	.....	.....
Cincinnati	115.00	37.00	....	18.00	22.00	.09	.....	18.50	.....	.07	.08	.....	.....
Cleveland	100.00‡	32.75	2.85	19.00	23.25	.075	.085	.075†	.0425†	.06	.085	.10	.....
Dallas	.....	30.00	....	16.10	21.10	.0525	.10	15.65	23.15	.055	.107	.1438	.....
Detroit	.....	37.00	....	19.67*	24.87*	.....	.....	17.00	22.50	.055	.11	.15	.....
Kansas City	.....	45.00	....	18.50	23.50	17.50#	22.50#	.077†	.107†	.057	.11	.15	.....
Los Angeles	.....	50.00	....	10.34	14.50	10.34#	14.50#	10.34	.....	.042	.06	.12	.....
Minneapolis	.....	.....	2.50	18.20	24.70	.098	.098	21.85	34.65	.048	.....	.....	.....
Montreal	70.00	60.00	3.62	14.00	19.66	.07	.093	19.00	26.50	.07	.135	.165	.....
New Orleans	100.00	32.00	....	16.00	21.00	.075	.10	.09†	.125†	.....	.0785	.11	.....
New York	130.00§	65.00	2.64	17.00	22.00	.075	.10	.09†	.125†	.....	.075	.11	.....
Philadelphia	110.00	45.00	2.25	13.50	18.00	.05	.08	.05†	.08†	.045	.08	.....	.....
Pittsburgh	115.00	40.00	....	19.00	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....	.....
St. Louis	40/115.00	35.00	....	18.50	23.50	.0775	.1075	.875†	11.75†	.04	.09	.125	.....
San Francisco	.....	50.00	....	12.00	18.00	12.00#	18.00#	12.50#	23.00#	.04	.0575	.117	.....
Seattle	.....	55.00	....	25.50	25.50	17.00#	23.00#	15.00	.....	.03	.19	.20	.....

Note: Paving asphalt, tank car or boat, f.o.b. Maurer, N. J., per ton, Bermudes, $25.00; Trinidad, $21.00. *Per sq. yd. †Per gallon. ‡4½x6x5½in. #Per ton. §4x5x9-in. Av. [4]Mexican. [z]Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. [3]120-300 penet. [4]80-120 penet.

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS	RIVETS	WIRE NAILS	SHEET PILING	STEEL RAILS (Per Gross Ton)			TRACK SUPPLIES			
		¾-in. billet,	½-in. structural	Base	Base	Standard	Light	Re-rolled	Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$1.95	$2.10	$3.00	$2.55	....	$36.375	$34.375	$35.00	$2.55	$2.60	$1.90	$3.60
Chicago	1.85	2.10	3.00	....	$2.25	36.375	35.00	34.00	2.55	2.60	1.90	3.60
Pittsburgh	1.80	2.05	2.90	2.40	2.15	36.375	35.00	34.00	2.55	2.60	1.90	3.60

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

F.O.B. WAREHOUSE	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ¾ in., base price		EXPANDED METAL LATH (Per 100 sq.yd., carload lots)		WELDED FABRIC REINFORCING (Per 100 s.f., carload lots)		6x6 in., No. 6 & 6 wires Per sq.yd.	SHEET PILING Per 100 lb. base price
		New billet	Rail steel	Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires		
Atlanta	$3.36	$2.34	$2.19	$21.00	$23.00	$1.53	$1.16	$0.1449	$2.70
Baltimore	3.00	2.75	2.60	25.00	28.00	1.41	1.08	.1332	2.90
Boston	3.54	2.923	1.925	20.00†	22.00†	1.46	1.12	.1449	2.60
Chicago	3.20	2.10	1.95	22.00	24.00	1.40	1.08	.1323	2.25
Cincinnati	3.40	3.25	3.25	25.01	29.50	1.39	1.07	.1287	....
Cleveland	3.31	2.75	2.60	20.00	22.00	1.37	1.06	.1287	....
Dallas	3.25	2.80	2.65	22.00	25.00	1.63	1.23	.1548	2.985
Denver	3.95	3.76	3.61	22.00	25.00	1.68	1.26	.1584	....
Detroit	3.42	2.20	2.05	20.00†	22.00†	1.41	1.08	.1323	2.43
Kansas City	3.75	2.75	2.60	18.45	21.35	1.50	1.14	.1422	2.69
Los Angeles	3.00	2.525	....	23.00	27.50	1.68	1.26	.1584	2.65
Minneapolis	3.45	2.86	2.71	22.00	26.00	1.51	1.15	.1431	2.57§
Montreal	3.15	2.40	2.30	32.00	33.00	2.30	1.71	.238	2.80
New Orleans	....	....	....	19.00	23.00	1.54	1.17	.1458	....
New York	3.37	2.50	2.35	18.50	20.50	1.43	1.10	.1350	2.50
Philadelphia	2.98	3.06	2.22	20.00	24.00	1.42	1.09	.1332	2.46
Pittsburgh	1.80‡	1.85‡	1.70‡	20.00‡	22.00‡	1.34	1.04	.1260	2.15
St. Louis	3.45	3.00	2.85	22.00	24.00	1.42	1.09	.1341	2.30
San Francisco	3.50	2.475	2.325	23.00	28.00	1.68	1.26	.1584	2.60
Seattle	3.55	2.50	....	30.00	33.00	1.68	1.26	.1584	2.60

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis. †f.o.b. delivered.

PAINTING AND ROOFING SUPPLIES—F.O.B.

	RED LEAD Per 100 lb. in 500-lb. lots Dry	WHITE LEAD Per 100 lb. in 500-lb. lots# in oil	READY-MIXED PAINT Per gal., drums Graphite*	Aluminum†	Ferric Oxide‡	ROOFING SUPPLIES Carload lots, f.o.b. factory Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 350-lb. bbl., per ton
Atlanta	$7.75	$10.50	$1.60	$3.10	....	$1.69	$1.74	$1.74	$.36	$25.40
Baltimore	7.00	10.00	1.40	2.25	$1.90	2.35	2.55	2.55	.48	25.00
Birmingham	7.25	10.50	2.35	2.35	1.85	1.68	1.63	1.69	.36	21.88
Boston	7.00	10.00	1.80	2.65	.05x	1.80	3.25	3.25	.42	22.00
Chicago	7.00	10.00	1.35	2.45	1.30	1.55	2.50	2.50	.38	22.00
Cincinnati	7.00	10.00	1.45	2.50	1.40	2.40	2.39x	2.39x	.36	21.00
Cleveland	7.00	10.00	1.65	2.30	1.40	1.60	1.79	1.79x	.24	20.00
Dallas	7.25	11.00	1.80	2.24	....	2.40x	4.17	4.17	.15	35.00
Denver	7.50	10.75	2.55	....	....	2.25	3.55	3.55	.35	30.00
Detroit	7.00	10.00	1.65	2.30	1.40	2.55	2.80	2.55	.35	30.00
Kansas City	7.00	10.12½	1.25	2.65	1.00	2.05	3.10–3.20	3.10–3.20	.23	24.50
Los Angeles	7.25	10.25	1.60	2.25	2.30	2.00	1.50	....	.45	....
Minneapolis	7.00	10.12½	....	....	....	1.55	1.63x	1.63x	.29	23.30
Montreal	....	8.20	1.85	3.50	1.85	1.90	2.44	1.88	1.55§	1.52§
New York	7.00	10.00	1.70	2.25	1.50	1.55	1.63x	1.63x	.232	22.00
Philadelphia	7.00	10.00	2.50	2.95	1.50	1.68	1.86x	1.48x	.37	22.00
Pittsburgh	7.00	10.00	1.05	1.95	.80	1.75	1.65x	1.65	.38	25.00
St. Louis	10.00	10.00	1.85	2.45	1.30	1.76x	3.00	3.00	.26	25.00
San Francisco	7.25	10.25	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	7.25	10.25	1.80	2.85	2.20	3.30	2.66	2.60	.60	30.00

*U. S. War Dept. Spec. 3-49A. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. §Per 100 lb. xPer roll, 65 lb. xPer lb.
Note: Red lead in oil 50c higher than white lead in oil. #Basis of quoting changed this month from list to 500-lb. lots.

MISCELLANEOUS ITEMS

	WINDOW GLASS Discounts from latest jobbers List, Sept. 15, 1928 Single or Double Thickness A quality	B quality	EXPLOSIVES Per lb. dynamite delivered 50-lb. cases Gelatin 40%	60%
Atlanta	85%	85%	$0.155	$0.17
Baltimore	88%	90%	.16	.175
Birmingham	88%	90%	.105	.120
Boston	88–10–5%	90–10–5%	.155	.17
Chicago	87%	89%	.155	.17
Cincinnati	89–10%	91–10%	.27	.29
Cleveland	85–10%	85–10%	.20	.215
Dallas	87%	89%	.17	.185
Denver	86%	88%	.155	.17
Detroit	87–10%	89–10%	.225	.240
Kansas City	86–10%	88–10%	.16	.175
Los Angeles	90%*	90–40%	.1725†	.1925†
Minneapolis	86%	88%	.175	.19
Montreal	60–30%	70–5%	.1875	.2125
New Orleans	88%	90%	.19	.22
New York	88%	90%	.225	.24
Philadelphia	88%	90%	.1550	.17
Pittsburgh	88%	88%	.11	.1250
St. Louis	89%	89%	.11	.125
San Francisco	82%	87%	.1575	.1775
Seattle	90–10%	90–20%	.1425	.1575

*Disc. from list Aug. 1, 1929. †F.o.b. Arsenal. ‡Double thickness A & B.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York.	
Bleaching powder, in drums, F.o.b. works, per 100 lb.	$2.00 @ $2.25
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	22.00 @ 35.00
Chlorine cylinders, per lb. delivered	.055
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.35
Soda ash, 58%, in paper bags, per 100 lb.	1.25
Sulphate of aluminum, commercial, in 100 lb. bags per ton	27.00
Sulphate of copper, in bbl., per 100 lb.	3.85

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.12	$0.165	$0.13	$0.16
12 in.—2 ft. from butt.	6 in.	50 to 59 ft.	.16	.21	.15	.20
12 in.—2 ft. from butt.	6 in.	60 to 69 ft.	.17	.225	.16	.21½
14 in.—2 ft. from butt.	6 in.	50 to 69 ft.	.195	.235	.20½	.24½
14 in.—2 ft. from butt.	6 in.	70 to 79 ft.	.2125	.245	.24½	.30½
14 in.—2 ft. from butt.	5 in.	80 to 85 ft.	.275	.385	....	....
14 in.—2 ft. from butt.	5 in.	85 to 89 ft.	.315	.452	....	....

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
Boston	Oak, untreated	$1.25	$1.80
	Pine, untreated	1.35	1.85
	Pine, creosoted	1.75	2.45
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	....	1.00
	White oak, untreated	.75	1.50
Birmingham	White oak, creosoted	no market	
	Southern pine, untreated *6x8x8'6'	.45*	.60
	Southern pine, creosoted	1.00*	1.20
Chicago	White oak, untreated	1.15	1.40
	Oak, empty cell, creosoted	1.50	1.88
	Oak, zinc treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.50	.72
	Fir, creosoted	1.67	2.40
Philadelphia	Red oak, untreated	1.00	....
	Red oak, creosoted	....	2.10
	White oak, untreated	1.03	1.35
St. Louis	Red oak, untreated	1.00	1.30
	Red oak, creosoted	1.45	1.90
San Francisco	Sap Pine or cypress, untreated	.90	1.25
	Douglas fir, green, untreated	.45	.63
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.00	1.10
	Birch or maple, creosoted	1.25	1.55

CURRENT PRICES OF CONSTRUCTION MATERIALS

WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE				CLAY DRAIN TILE		CONCRETE SEWER PIPE		WROUGHT STEEL PIPE			
	Per net ton, f.o.b. 6 in. to 24 in.*	Per foot, delivered, standard (‡ f.o.b.) 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered; ASTM C 14-24 12 in.	24 in.	Full standard weight. # 1 to 3 in., Butt Weld Black	Galv.	3½ to 6 in., Lap Weld Black	Galv.
Atlanta	$43.00	$0.225	$0.405	$1.4625	$3.25	$80.00	$128.00	$0.50	$1.625	44%	37%	42%	34%
Baltimore	46.50	.25	.50	2.10	5.75	108.00	168.50	.75	1.75	.....	.....	.....	.....
Birmingham	39.00	.25	.45	1.625	4.66	85.00	220.00	.45	1.60	64%	55%	65%	56%
Boston	46.50	.18‡	.351	1.62	5.0225	102.60	153.00	.378	2.15	.....	.....	.....	.....
Chicago	47.50	.31	.61	2.25	6.25	100.00	150.00	.675	2.25	53%	42%	54%	43%
Cincinnati	46.00	.185	.351	1.485	5.125	69.00	108.00	.40	1.40	53.04%	42.02%	54.265%	43.245%
Cleveland	47.50	.161	.3105	1.305	4.305	42.50	88.50	.35	1.74	58.4%	48.4%	60.6%	49.6%
Dallas	51.00	.25	.45	1.80	.....	160.00	250.00	.41	1.41	64%	55%	64%	55%
Denver	59.00	.27‡	.47‡	1.98‡	.....	105.00	180.00	.....	.....	56%	45%	43%‡	57%
Detroit	47.50	.245	.4725	2.025	5.74	82.00	136.00	.35	1.20	49%	38%	50%	39%
Kansas City	49.00	.32	.57	2.27	4.90	120.00	140.00	.40	1.50	49%	38%	50%	39%
Los Angeles	47.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	53.57%	43%	53%	42.51%
Minneapolis	49.50	.255	.459	1.836	4.67	.....	.....	.50	1.34	.....	.....	.....	.....
Montreal	50.00	.80	1.50	6.00	.....	45.00	75.00	.51	2.04	.....	.....	.....	.....
New Orleans	45.00	.32	.51	1.65	.....	67.00	.....	.45	2.00	.....	.....	.....	.....
New York	46.00	.29	.57	2.25	6.35	.....	.....	.55	2.00	51.88%*	40.86%*	53.10%*	42.08%*
Philadelphia	43.00	.336	.648	2.835	8.68	175.00	210.00	.54	1.80	52.37%*	41.35%*	53.39%*	42.57%*
Pittsburgh	49.00	.175‡	.3375‡	1.44‡	4.81‡	69.00	108.00	.75c	1.75	64%	55%	65%	56%
St. Louis	46.00	.255	.459	1.836	3.96	85.00	170.00	.80	2.00	51.266%	40.245%	52.49%	41.47%
San Francisco	47.00	.265	.477	1.908	5.22	103.50	172.50	.45	2.20	52.4%	63.4%	51.1%	64.6%
Seattle	48.50	.35†	.63†	2.52†	6.30†	96.00	200.00†	.50†	1.80	65.80%	57.25%	66.75%	56.30%

*b. & s. class B and heavier, C/L lots, 200 tons and over. Burlington, N. J. (base) $43.00. Gas pipe and class A, $3 per ton additional. 4-in., $3 per ton additional. 30 in. and larger usually $2 per ton less. ‡Price at factory. †Less 30% in C/L Lots.

#Discounts from standard list for delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¼ in., 8½c; ⅜ in. 11½c.; ½ in. 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92.

‡2½ to 3 in. =Resale price to consumer, car load lots shipped from mill.

c Concrete Culvert pipe reinforced.

LUMBER AND TIMBER—PER M FT. B.M., CARLOAD LOTS F.O.B.

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR									LONG LEAF Y. P.	
		All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. All Fir planks No. 2 common; Fir timber is No. 1 common. Lengths up to 20 ft.									Merchantable grade up to 20 ft.	
		1x6,S	1x8,S	2x4,S	2x6,S	2x8,S	2x10,S	3x12,R	6x12,R	12x12,R	2x12,R	12x12,R
Atlanta	Southern Pine	$15.50	$15.50	$17.50	$17.50	$17.50	$19.50	$25.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	23.00	24.00	29.50	28.50	29.00	30.50	37.50	.....	.....	54.00	55.00
	Douglas Fir	29.00	29.00	31.00	29.00	30.00	30.50	32.00	$33.00	$34.00	.....	.....
Birmingham	Southern Pine	19.00	18.25	18.00	17.00	19.00	18.00	26.00	26.00	41.75	.....	.....
	Long Leaf	21.00	21.50	21.50	20.50	21.50	23.50	39.00	.....	.....	34.00	41.75
Boston	Southern Pine	27.00	27.00	32.00†	33.00†	47.00†	55.00†	70.00†	.....	.....	70.00	53.00
	Douglas Fir	27.00	27.00	30.00	33.00	35.00	35.00	40.00	41.00	41.00	.....	.....
Chicago	Southern Pine	28.00	28.00	32.00	31.00	31.00	34.00	44.00	.....	.....	53.00	57.00
	Douglas Fir	33.00	34.00	38.00	36.00	37.00	38.00	40.00	40.00	40.00	.....	.....
Cincinnati	Southern Pine	23.00	25.00	26.00	25.00	25.50	26.50	40.00	.....	.....	31.50	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	43.50	46.25	46.25	.....	.....
Cleveland	Southern Pine	28.00	30.00	36.00	30.00	34.00	36.00	47.00	45.00	.....	50.00	62.00§
Dallas	Southern Pine	d28.35	30.60	31.50	29.80	30.15	30.15	50.40	.....	.....	42.75	67.95
Denver	Douglas Fir	41.00	41.00*=	42.00*	42.00*	42.00*	46.00*	52.00*	56.00*	61.50	.....	.....
Detroit	Southern Pine	24.00	24.00	25.00	24.50	24.50	25.50	35.00	.....	.....	29.00	41.50
	Douglas Fir	.....	.....	.....	.....	.....	.....	41.50	41.50	41.50	.....	.....
Kansas City	Southern Pine	23.50	24.00	23.50	23.00	23.50	24.50	34.00	.....	.....	53.00	60.00
	Douglas Fir	27.50	28.50	29.00	27.50	27.50	30.00	33.00	35.00	35.00	.....	.....
Los Angeles	Douglas Fir	31.00y	31.00y	31.00y	31.00y	31.00y	31.00y	38.00y	48.00y	41.00y	.....	.....
Minneapolis.c	Western Pine	45.00*	51.50*	50.00*	41.00*	41.00*	42.00*	59.50*‡	.....	.....	58.00*‡	.....
	Douglas Fir	39.00*	42.00*	43.50*	41.00*	41.00*	42.00*	59.50*	59.50*	59.50*	.....	.....
Montreal	Spruce	28.00	29.00	25.00	27.00	30.50	33.00	36.00	.....	.....	.....	.....
	Douglas Fir	47.50	53.00	42.50	44.00	44.00	45.75	51.00	51.00	51.00	43.00	.....
New Orleans	Southern Pine	23.50	25.50	28.00	25.00	27.00	25.50	38.0u	.....	.....	44.00	54.00
	Douglas Fir	28.50	30.00	33.00	29.00	32.00	33.50	37.00	.....	.....	.....	.....
New York	Southern Pine	33.00*	34.00*	33.00*	34.00*	34.00*	38.00*	45.00*	.....	.....	70.00*	70.00*
	Douglas Fir	.....	.....	37.00*	37.00*	35.00*	38.00*	40.00*	43.00*	43.00*	.....	.....
Philadelphia	Southern Pine	30.00	31.00	32.00	32.00	33.00	34.00	36.00	.....	.....	36.00	42.00
	Douglas Fir	45.00	45.00	45.00	45.00	45.00	45.00	45.00	42.00	42.00	.....	.....
Pittsburgh	Southern Pine	39.50	31.90	37.65	33.75	36.52	37.50	47.75	.....	.....	57.50	57.50
	Douglas Fir	38.52	39.70	39.70	38.55	39.10	39.38	53.25	53.25	53.25	.....	.....
St. Louis	Southern Pine	28.00*x	29.00*x	29.00*x	27.50*x	28.50*x	30.00*x	47.00*x	.....	.....	.....	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	.....	54.00*x	54.00*x	72.00	70.00
San Francisco	Douglas Fir	20.00f	20.00f	21.50f	21.50f	22.00f	22.50f	24.50	25.00f	25.00	.....	.....
Seattle	Douglas Fir	14.00	15.00	15.00	14.00	14.00	14.00	20.00	19.00	19.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y. P. §Norway Pine. ‖Northern Pine. =Native. tAt ship's tackle. yYard prices. d10% Disc. taken off. x5M ft. orless sS4S. RRgh. fContractors in Minneapolis and St. Paul get 15% disc. from list.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Common Labor Heavy Const.
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.75/1.50	$0.60/1.00	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	.60/1.00	1.00	1.125	1.00	.30/.40†	.30/.40†
Boston	1.20	.70/1.175	1.20	.90/1.375	1.375	.50/.70	.50/.70
Cincinnati	.80/1.375	.65/1.20	1.25	1.00/1.25	.80/1.375	.45	.45
Chicago	1.50	1.50	1.50	1.50	1.50	.95	.95
Cleveland	1.375	1.12½	1.25	1.25	1.375	.72	.72
Dallas	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.25/.40	.25/.40
Denver	1.10	1.10	1.10	.....	.....	.50	.50
Detroit	1.25	1.00	1.25	.75/.95	1.25	.55/.75	.55/.75
Kansas City	1.325	1.125	1.125	1.125	1.325	.70	.45/.50
Los Angeles	1.10	1.10	1.125	1.125	1.25	.50	.60
Minneapolis	1.00	.70/.85	1.00	.85	1.00	.40	.45/.50
New Orleans	1.00	.75	1.00	1.00	1.25	.30/.40	.30/.40
New York	1.50	1.40	1.475/1.65	1.50/1.65	1.50	.82½	.50/.80
Philadelphia	.35/1.50	.65/1.10	.70/1.375	.90/1.00	1.10/1.37	.35/50	.40/.50
Pittsburgh	1.00	1.00	1.00	1.00	1.00	.70	.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78½	.35/.78½
San Francisco	1.50*	1.10	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.00	1.00	1.25	1.25	1.25	.60	.60
Montreal	1.00	1.00	1.25	1.25	1.25	.50	.50

Skilled Avg: (Bricklayers, Carpenters, Ironworkers) $1.119 Common Avg. $0.547 *6-hr. Day. † PWA.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Sacramento—City plans two 3 m.g. concrete water storage tanks, one at State Fair Grounds, and another at Sacramento Stadium. Est. $368,000. H. D. Dewell, 55 New Montgomery St., San Francisco, engr. Awaiting approval of plans by P.W.A.

Calif., Santa Barbara—City soon takes bids constructing La Mesa Reservoir, $32,363; constructing El Cielito Reservoir, $29,000. E. B. Brown, city engr. Noted Oct. 21, C. D.—Oct. 24, E. N.-R.

Conn., Danbury—City rejected bids Jan. 13, for waterworks and filtration plant. Bids exceeded estimate. New plans and specifications to be made and bids called later. Chester Everett, 22 East 40th St., New York, engr. Noted Nov. 29, C. D.—Oct. 31, E. N.-R.

Ill., Elgin—City plans water supply. P.W.A. project. J. A. M. Robinson, 228 North La Salle St., Chicago, engr.

La., New Orleans—Sewerage & Water Bd., preparing plans and specifications for constructing new 30 in. water pipe in uptown section, $177,000; and water lines in Algiers, $83,000. Sewerage and Water Bd., engrs.

Mo., North Kansas City — City plans water supply system. Bond election Feb. 1. $410,000. Henri-Lowry Eng. Co., 1110 West 10th St., Kansas City, engrs.

Neb., Axtell—City voted $14,500 bonds for waterworks. $35,000. Henningson Eng. Co., 326 Union State Bank Bldg., Omaha, engrs. W.P.A. project.

Neb., Grand Island—City made plans constructing new watermains from Elm St. to C. B. & Q. R.R. tracks. W. Wheeler, city engr.

Nev., Mina — Town plans installing water system, incl. distribution system and pumping plant. $39,364. P.W.A. will furnish $16,364 and town $20,000. Noted Nov. 2, 1933, C. D.

N. Y., Albany—Bd. Contr. & Supply soon takes bids quantity of tunnel liner plates for new storage supply at Loudenville Reservoir. To exceed $1,000. J. J. McManus, city engr. Whitman, Requard & Smith, West Biddle and Charles Sts., Baltimore, Md., consult. engrs. Noted Dec. 4, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

O., Bryan—City plans extending 22,000 of 4- to 8-in. c.i. watermains to city limits. $40,000-$50,000. S. Folk, waterworks supt.

O., Delphos—City plans waterworks electrification. $25,000. G. A. Reese, Clark Bldg., Canton, engr.

Okla., Hooker—City made preliminary plans constructing watermain extensions and new pumping equipment. $60,000. Benham Eng. Co., Oklahoma City, engrs.

Ore., Jefferson—City Council soon takes bids constructing waterworks system. E. E. Howell, city recdr.

Wash., Seattle — City plans watermains as well as grading, graveling, curbs and concrete sidewalks on 29th Ave. W. from W. Roy St. to north line of Magnolia Vista addition. T. R. Beeman, County-City Bldg., engr.

Wash., Tacoma—City, bids in about 10 days, new pipe line 5/16- to 7/16-in. steel plate, welded 19,147 ft. 48 in. rein.-con. alternate 2,512 ft. 48 in. 6/16 in. or 7/16 in. steel welded, 16,256 ft. lock joint type concrete, 363 ft. 48 in. steel pipe and connections. Part of 3rd Govt. loan. W. A. Kunyk, City Hall, engr.

Ont., Kitchener—City, replacing compressor at waterworks building, Shande St., by installing Diesel master and generating unit of about 250 hp. and 300 hp. gasoline reserve engine. M. Pequegust, City Hall, supt.

Ont., Pickering—Village Council, G. W. Baker, chn., plans installing waterworks system.

BIDS ASKED

★ **Calif., Los Angeles**—Mar. 13, by Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., constructing Eagle Mountain Pumping Plant, for Colorado River Aqueduct, Spec. 143, 10 mi. north of Desert Center, Riverside Co. $900,000.

Calif., Santa Barbara—Feb. 10, by City Council, constructing works for Sheffield Filtration Plant, consisting of clarifier tanks, etc., $160,000; raising Sheffield Reservoir, concrete lining same, etc., $203,636. P.W.A. project. E. B. Brown, City Hall, engr. Quinton, Code, Leeds, Hill and Barnard, 601 West 5th St., Los Angeles, consult. engrs. Noted Oct. 21, C. D.—Oct. 24, E. N.-R.

★ **Ia., Keokuk** — Feb. 24, by City Council, waterworks system, incl. building, distribution system, equipment, elevated tank, switchboards, electrical wiring, boiler, stoker, pipes, valves, hoists, fittings, mains, hydrants, etc. $848,457. Brown Eng. Co., Ottumwa, engrs. Noted Nov. 21, C. D.—Nov. 28, E. N.-R.

Mich., Muskegon—Feb. 17 (extended date), by City Comn., constructing 16 m.g.p.d.c. filtration plant superstructure and other equipment, 1 m.g. elevated steel tank and tower, P.W.A. Docket 1307. Noted Jan. 24, C. D.

N. J., Hoboken—See "Contracts Awarded."

N. Y., Appalachian—Feb. 11, by Water Dist., constructing complete water system. $50,000. Nussbaumer & Clarke, Security Bldg., Binghamton, engrs. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

N. Y., Cheektowaga — See "Contracts Awarded."

N. Y., Gowanda—See "Contracts Awarded."

N. Y., Little Valley — See "Contracts Awarded."

N. Y., Niagara Falls — See "Contracts Awarded."

N. Y., Salamanca—See "Contracts Awarded."

Tex., Decatur — Feb. 14, by City, c/o A. Ingram, mayor, waterworks improvements, incl. 2 shallow wells, storage reservoir, pump houses, new pumping equipment, valves, hydrants, fittings, etc. P.W.A. project. F. J. Von Zuben, Electric Bldg., Fort Worth, engr.

Wash., Morton—Feb. 17, by Leola Lampkin, town clk., 10,000 ft. 10 in. creosoted wood or steel pipe for gravity line, also 18,000 c.i. distribution system. $41,818. P.W.A. project.

LOW BIDDERS

★ **Que., Montreal**—Executive Com., City Hall, Jan. 29, constructing new water intake supply and laying 6 concrete, steel lined pipes, for 5 pipes and for 4 pipes, from Northern Constr. Co. Ltd., Montreal, $1,925,000, $1,823,000, $1,685,000. Est. $2,000,000. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

CONTRACTS AWARDED

★ **Calif., Los Angeles**—Directors Metropolitan Water Dist., F. E. Weymouth, engr., 306 West 3rd St., furnishing centrifugal pumps for main pumping plants of Colorado River Aqueduct, Spec. 116, at Intake and Gene Plants, to Bryon Jackson Pump Co., 2150 East Slauson Ave., Hutington Park, $215,451***Iron Mountain Plant, to Allis Chalmers Mfg. Co., 458 South Spring St., $98,300***Eagle Mountain and Hayfield Plants, to Worthington Co., Harrison, N. J., and 5075 Santa Fe Ave., $249,400. Grand total $563,151. Bids Dec. 3, awarded Jan. 24. Noted Dec. 12, C. D.—Aug. 15, E. N.-R.

Calif., Los Angeles—Kagel Canyon Water Dist., constructing waterworks system in Kagel Canyon Water Dist., near San Fernando, involving c.i. watermains, drilling well, erecting steel tank and installing pumping equipment, relief labor. Est. $72,570. W.P.A. project. R. E. Shonerd, Hall of Records, co. mechanical engr.

★ **Calif., Los Angeles** — Metropolitan Water Dist., F. E. Weymouth, engr., 306 West 3rd St., constructing Iron Mountain Pumping Plant, Spec. 136, incl. construction of plant buildings together with inlet works, outlet structures, electrical switching stations, etc., in San Bernardino Co., 15 mi. west of Rice, to Wood & Bevanda, Stockton, $719,355. Est. about $800,000. Bids Jan. 14, awarded Jan. 24. Noted Jan. 17, C. D.—Dec. 12, E. N.-R.

Calif., San Francisco—Public Utilities Comn., City Hall, laying 1,500 lin.ft. 20 in. and 13,900 lin.ft. 24 in. steel feeder mains in Bacon, Phelps, Williams, Third and Thornton Sts., to Macdonald & Kahn, Financial Center Bldg., $137,965. Bids Jan. 15, awarded Jan. 22.

Fla., Clearwater—Pinellas Co., building 15 mi. water pipe line for Pinellas Gulf beaches from Pass-A-Grille, northward to Indian Rocks, to Boyce Constr. Co., Clearwater, $174,492*** work on the same project, to J. B. McCrary Co., 22 Marietta St. Bl., Atlanta, Ga., $63,450, and Taylor Iron Wks., Macon, Ga., $14,090. Grand total $252,032.

Ga., Roswell—City, water tank, to Chicago Bridge & Iron Wks., 1500 North 50th St., Birmingham, Ala., $7,485. Est. $10,000. Noted Dec. 6, C. D.—Aug. 29, E. N.-R.

Ga., Waynesboro—City, c/o H. Cliff, Hatcher, Waynesboro, Contrs. 1, 2 and 3, waterworks, to J. B. McCrary Co., 22 Marietta St. Bldg., Atlanta, $77,123***Contr. 4, to R. H. Bouligny, Inc., 433 West Morehead St., Charlotte, N. C., $5,730. Est. $92,680. P.W.A. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

Idaho, Kimberly—Town, constructing c.i. distribution system, elevated steel tank and 100 ft. tower, pump and motor, to West Coast Constr. Co., Lloyd Bldg., Seattle, Wash., $28,395. P.W.A. Bids Dec. 27.

Ill., Duquoin—City, waterworks improvements, incl. dam, impounding reservoir, spillway, intake, low service pipe, purification plant, clear water reservoir, high service pipe, high and low service pumps, 200,000 gal. steel tank on tower, to Stiers Bros. Constr. Co., 2944 Magazine St., St. Louis, Mo., $236,870. Est. $268,000. Bids Jan. 10, awarded Jan. 10. P.W.A. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Ill., Lansing—Village, waterworks, to G. D. Hardin Co., 1033 East 49th St., Chicago, $40,000. P.W.A. Bids Dec. 11. Noted Dec. 9, C. D.

Ind., Connersville—Bd. P. Wks., W. F. Dentlinger, mayor, general contract building addition, to L. J. Street, 2537 Burton Ave., Indianapolis, $27,341***electrical wiring, to Electric Shop, Rushville, $11,920***drilling well, to G. C. Stremmel, Lafontaine, $1,981***water meter, to I. C. Dehaven Co., 725 Circle Tower, Indianapolis, $861***vacuum pump, to Dean Hill Pump Co., Anderson $399***2 Diesel engines, to Cooper Bessemer Co., Grove City, Pa., $41,864. Grand total $84,366. P.W.A. For 8 deep well pumps, to American Well Wks., Aurora, Ill. Bids Jan. 14. Noted Jan. 13, C. D.—Jan. 9, E. N.-R.

Ind., Yorktown—Town Bd., H. Watkins, clk., constructing waterworks, to J. Dehner, Inc., 1206 Clark St., Fort Wayne, $36,000. Est. $40,000. Subject to P.W.A. Bids Jan. 23. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Ia., Stanhope — Town, furnishing, installing water tank and tower, to Pittsburgh Des Moines Steel Co., 1015 Tuttle St., Des Moines, $4,466. Est. $5,000. P.W.A. Bids Dec. 15, awarded Dec. 15.

Md., Towson—Baltimore Co., furnishing, laying 44,275 lin.ft. 6- to 12-in. c.i. watermains and appurtenances thereto in various portions of Baltimore Co., to Marocco Constr. Co., 231 South Exeter St., Baltimore, $103,019. P.W.A. Bids Jan. 14. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

Minn., Kellogg—Village, J. Keenan, clk., 13,000 lin.ft. c.i. pipe for water system, to St. Cloud Constr. Co., St. Cloud, $20,789***one 50,000 gal. steel tank on 100 ft. tower, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $6,980***one 10 in. drilled well, to P. J. Thien, Clara City, $895. Grand total $28,664. P.W.A. Bids Jan. 18. Noted Jan. 10, C. D.

Neb., Stella—City, water meters and bronze bodies for waterworks, to L. L. Kinsey & Son, Stella, $350***single jacket fire hose and play pipes, to Interstate Mchy. & Supply Co., 1006 Douglas St., Omaha, $459***copper service pipe and materials for house service connections, to A. Y. McDonald Mfg. Co., 1201 Dodge St., Omaha, $561***pipe, to American Cast Iron Pipe Co., Fidelity Bank Bldg., Kansas City, Mo., $7,545***pipe line labor and hand trenching, to G. L. Cernohlinlak, Humboldt, $4,965. Grand total $13,881. P.W.A. Bids Jan. 9. Noted Jan. 3, C. D.

N. J., Hoboken—City, reconstructing 1,120 ft. dilapidated water lines throughout city. W.P.A. relief labor. $30,069. F. W. Brannagan, 243 Washington St., Jersey City, W.P.A. engr.

N. Y., Cheektowaga—Village, constructing 6 in. watermain in Union Rd. from William St. to French Rd., day labor. $30,000. W.P.A. E. Noonan, Bailey Bldg., Lockport, Procurement Officer W.P.A. will purchase materials.

N. Y., Gowanda—Village, constructing pumping station and earthfill dam with concrete spillway, relief labor. $25,000. W.P.A. E. Noonan, Procurement Officer for W.P.A., Bailey Bldg., Lockport, will purchase materials.

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Projects $500,000 and over symbol ★

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†*Federal Government.*

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These prisms of 1-5 mix (identical in every detail except that the prism on the left was fortified with Pozzolith) were tested in an independent, impartial laboratory. Note the relatively small amount of disintegration apparent in the Pozzolith-fortified specimen as contrasted to the extreme degree of disintegration suffered by the ordinary prism at the right.

Break-tests for strength, after the freezing and thawing cycles, revealed that the Pozzolith-fortified prism was 75% stronger and had 22% less loss in weight than the ordinary specimen.

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● Actual unretouched photo.

THE MASTER BUILDERS COMPANY

Cleveland, Ohio

Constr. News page 82

Waterworks (Continued)

N. Y., Little Valley — Village, improving municipal water system, incl. replacing 13,000 ft. screw pipe with 6 and 8 in. c.i. pipe, day labor, under supervision of Village Eng. Dpt. $27,716. **W.P.A. Maturity at once.** Noted Sept. 27, C. D.—**Oct. 3, E. N.-R.**

N. Y., Lockport—See "Sewerage and Waste Disposal."

N. Y., Newark — Village, additional water-mains in Maple Court, Stansell and North Main Sts., Colton, East, Grace and Peirson Aves., own forces, $13,000, will apply for W.P.A. or P.W.A. funds; storm sewers in Blackmar and Sagrist Sts., $12,000, own forces. J. E. Williamson, Federal Bldg., Elmira, Procurement Officer W.P.A. will purchase materials for latter project.

N. Y., Niagara Falls—City, constructing watermains in Aluminum Rd., River Shore Dr., Jayne Pl., Luick, Schantz and Pine Aves., 93rd, 82nd and Frontier Sts., relief labor. $90,000. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, Procurement Officer W.P.A. will purchase materials.

N. Y., Salamanca—Village, cut supply lines (water), and place gate valves on municipal water system fire hydrants, relief labor, $8,-000. **W.P.A.** E. Noonan, Procurement Officer W.P.A., Bailey Bldg., Lockport, will purchase materials. Noted Nov. 14, C. D.—Nov. 21, **E. N.-R.**

N. C., Fountain—Town, constructing wells for waterworks, to Sydnor Pump & Well Co., Richmond, Va., $3,797; tanks, to Chicago Bridge & Iron Wks., 1500 North 50th St., Birmingham, $5,975. **P.W.A.** Bids Dec. 27. Noted Jan. 10, C. D.—Jan. 16, **E. N.-R.**, under "Contracts Awarded."

N. C., Hemp—See "Sewerage and Waste Disposal."

O., Beach City—Village, constructing 300,-000 gal. water treatment plant, to L. W. Kilgore Co., 1311 Cherry Ave. N.E., Canton, $21,-000. Est. $25,000. All water passing through Beach City will be softened. Noted Oct. 31, C. D.—Nov. 7, **E. N.-R.**

O., Bellevue—Improving waterworks, Contr. C, gravity supply line, to Lowensohn Constr. Co., 1740 East 12th St., Cleveland, $73,857. **P.W.A.**

O., Canfield — Village, waterworks system, Contr. 4, pumps and pump house, to R. J. Neff Co., Canfield, $6,565. **P.W.A.**

O., Cincinnati — City, watermains Oakley Feeder main, Contr. 1, laying pipe, to M. F. Quill & Son, 512 East 13th St., $58,920. **P.W.A.** Noted Dec. 11, C. D.—Dec. 19, **E. N.-R.**

O., Cincinnati—City, waterworks improvement, Contr. E-11, centrifugal pumps, to Gould Pumps, Inc., Seneca Falls, N. Y., $2,060. **P.W.A.**

O., Groveport—City, waterworks, Contr. 2, distribution system, to N. E. Miller, Columbus, $32,750. **P.W.A.**

O., Lisbon—Village, improving waterworks, Contr. 1, to Gallagher & O'Horo, 1816 Wilson Ave., Youngstown, $4,800***Contr. 2, to Westinghouse Electric & Mfg. Co., East Pittsburgh Works, Pittsburgh, Pa., $1,772***Contr. 3, to Heim & Heim, Lisbon, $7,266***Contr. 4, to Bayley & Hindley, East Liverpool, $2,740*** Contr. 5, to M. DeBartolo, 37 West Judson Ave., Youngstown, $6,117. Grand total $22,-695. **P.W.A.** Noted Nov. 29, C. D.

O., Nevada—City, waterworks system, Contr. C, distribution system, to H. E. Miller, 938 South High St., Columbus, $38,495; Contr. D, elevated tank, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $9,150. **P.W.A.**

O., Russelis Point—City, waterworks, Contr. 2, distribution system, to Christopher & Leach, Reynoldsburg, $39,279. **P.W.A.**

O., Sherwood — City, waterworks system, Contr. 1, wells, pumps and pump house, to Uncapher & Gillespie, Marion, $4,143. **P.W.A.**

R. I., Burrillville—State, Emergency P. Wks. Comn., State House, Providence, water supply system and tank, at Wallum Lake Sanatorium, to Pittsburgh-Des Moines Steel Co., 270 Broadway, New York, $51,500. Bids Dec. 5. **P.W.A.** Noted Dec. 16, C. D.—Oct. 10, **E. N.-R.**

S. D., Yankton—State Bd. Charities & Corrections, Pierre, constructing waterworks improvements, incl. 2,900 lin.ft. 4- to 10-in. c.i. mains, 250,000 gal. elevated tank, to Ellerman & McLean Co., Yankton, $25,085; 1,000 ft. 2½ in. double jacket fire hose, to W. S. Nott Co., 201 North 3rd St., Minneapolis, Minn., $1,050. **P.W.A.** Bids Jan. 15. Noted Jan. 8, C. D.

Tex., Albany—City, c/o B. M. Elich, mayor, waterworks improvements, incl. c.i. pipe line, valves, pavement replacement, water meters and fire hydrants, to D. Vickers, Sweetwater, $28,-281. Est. $29,000. **P.W.A.** Bids Dec. 13. Noted Dec. 23, C. D.—Dec. 5, **E. N.-R.**

Utah, Nephi—Town, materials for replacing steel pipe with c.i. pipe, also improving and extending distribution system, to Waterworks Equipment Co., 149 West 2nd St. S., Salt Lake City, $15,261; labor, to F. C. Davies Constr. Co., Spanish Fork, $5,649. Est. $25,000. **P.W.A. Bids Jan. 10.** H. Price, Provo, **engr.**

Utah, Sunset—Town, constructing pipe valves, hydrants, fittings for waterworks, to Pacific States Cast Iron Pipe Co., Provo, $5,823; labor, to E. Smith, 737 East 2nd St. S., Salt Lake City, $7,001. **P.W.A.** Bids Jan. 10.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Inglewood—City plans 1,500-ft. S. La Brea storm drain in Fairview Ave.—Hillsdale Ave. section, $81,000. A. W. Corey, City Hall, **engr.**

Conn., Bristol—City making plans storm sewers various sections. $35,000. C. Buell, City Hall, **engr.**

Ill., East St. Louis—East Side Levee & Sanitary Dist., 628A Missouri Ave., soon takes bids 195,000 ft. trunk sanitary sewers in Landsdown Section. $291,637. P.W.A. allotted $291,637 and District will sell $125,000 bonds. E. F. Harper, ch. engr.

Ill., Elmhurst—City plans sewage treatment plant, Incl. aerator, digester, tanks, clarifier, sludge tank and pumps, drying beds. $200,000. Alvord, Burdick & Howson, 20 West Wacker **Dr., Chicago, engrs.**

Ill., West Dundee—Village rejected bids Jan. 21, constructing trunk line sewers, treatment plant, lift station, pumping equipment, steel tank and service meters. Will readvertise. Alvord, Burdick & Howson, 20 North Wacker Dr., **Chicago, engrs.** Noted Jan. 28, C. D., Jan. 21.

Kan., Coffeyville—City, final plans in progress for Contr. 2, incl. pumping station and disposal plant. $130,000. Chas. A. Haskins & Co., 517 Finance Bldg., Kansas City, Mo., engrs.

Kan., Kansas City—City making plans clay or concrete sanitary sewer in 21st and Brown Sts. $25,000. C. E. Peterson, City Hall, Kansas City, Mo., engr. Noted Sept. 6, C. D.—**Sept. 12, E. N.-R.**

La., New Orleans—Sewerage & Water Bd., completing plans sewerage system, Algiers, $225,-000; sewage pumping station in Lakeview section of New Orleans, $320,000. Sewerage & Water Bd., New Orleans, engrs.

Neb., Omaha—City plans new sewers and replacements near 22nd and Spencer Sts. **$69,523. W.P.A. project.**

Neb., Omaha—City plans sewers on Lake St., $21,784; concrete monolith sewers in Harrison St., $19,460. D. F. McCauley, Bus. Bldg., W.P.A. engr.

N. Y., Dickinson—Town bids probably in March, constructing sewage disposal plant. Est. about $50,000. P.W.A. project. L. B. Phelps, Dickinson, engr.

N. Y., Olean—City Council soon takes bids constructing sewage disposal plant and incinerator. $175,000. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

★ **O, Dayton**—City plans constructing additional imhoff tanks, sedimentation chambers, drying beds, etc. at sewage disposal plant, $238,-874 released by W.P.A.. Total est. $900,000. W. W. Morehouse, dir. Water.

Okla., Oklahoma City—City made preliminary plans constructing new Belle Isle Main Sanitary Sewer, 16,000 ft. 18 and 24 in. vitr. clay pipe. $100,000. L. M. Bush, city engr.

Okla., Sapulpa — City plans sewage disposal plant. $75,000. F. Boone, city engr. W.P.A. project.

★ **Ore., Portland** — City making plans constructing intercepting sewer to keep sewage out of Columbia River on north side of city. $1,000,000. L. G. Apperson, city engr.

Pa., Erie—City plans storm sewers in Garrison Run Rd., Cascade and Liberty Sts. $40,-000. W.P.A. project. A. N. Aitkin, city engr.

Wash., Ellensburg — City plans sewage disposal plant. $150,000. L. R. Stockman, Baker, Ore., engr. Noted Dec. 16, C. D.—Dec. 19, **E. N.-R.**

Ont., Islington—Etobicoke Twp., report being prepared for submission to rate payers, sewerage system in Kingsway Dist. $360,000. W. H. Walker, Islington, engr.

BIDS ASKED

Conn., Milford—Feb. 14, by Bd. Sewer Comrs., Town Hall, A. C. Smith, secy., Contr. 2, constructing sewage treatment plant buildings for central portion of town, and Contr. 3, furnishing, installing equipment in sewage treatment plant.

Ill., Chicago—Feb. 13, by Sanitary Dist. of Chicago, J. J. Sullivan, clk., constructing West Towns Outlet Sewer, Contr. 2, incl. 9,920 lin.ft. concrete sewer 12 ft. internal width and 13 ft. 4 in. internal height, in tunnel in earth and rock, 1,320 ft. concrete sewer 5 ft. internal width and 6 ft. 3 in. internal height, in city of Berwyn. P.W.A project.

Ill., Chicago — Feb. 20, by Sanitary Sewer Dist. of Chicago, 910 Michigan Ave., constructing Southwest Sewage Treatment Works, Div. N, incl. pump and blower house superstructure, in Stickney Twp., Cook Co. P.W.A. project.

Ind., Greendale—Feb. 14, by Town Bd. A. F. Eberhardt, clk., constructing sewerage system, incl. 22,728 cu.yd. excav.; 19,510 ft. 8 and 12 in. vitr. salt glazed or rein.-con. pipe, 1,020 ft. 8 in. c.i. pipe, 4,310 sq.yd. street repairing. $71,000. P.W.A. project. C. Brossman, 1009 Chamber of Commerce Bldg., Indianapolis, engr. Noted Nov. 27, C. D.—Dec. 5, **E. N.-R.**

Federal Government.

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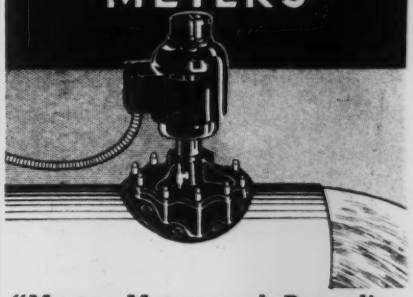
SPARLING
MAIN-LINE
METERS



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Sewerage, etc. (Continued)

Mass., Gardner—See "Contracts Awarded."

Mo., St. Louis—See "Contracts Awarded."

Neb., Trenton—Feb. 17, by City, constructing sewers. $27,000. H. A. Davis, Crete, engr.

N. J., Beverly City—See "Contracts Awarded."

N. J., Phillipsburg—See "Contracts Awarded."

N. Y., Albany—Mar. 2, by Bd. Contr. & Supply, City Hall, relocating and realignment of Arch Street trunk sanitary sewer. $195,000. P.W.A. project. J. J. McManus, city engr.

N. Y., Amsterdam—See "Contracts Awarded."

N. Y., Buffalo—See "Contracts Awarded."

N. Y., Lockport—See "Contracts Awarded."

N. Y., Long Island City—Feb. 10, by J. J. Halleran, acting pres. Queens Boro, Boro Hall, sewers in North Hempstead Turnpike, Dormans Rd., Farmers, Woodhaven, New York and Rockaway Blvds., Woodhaven, 111th, 114th, 116th, 119th, 128th Aves., Union Hall, 173rd, 199th and 201st Sts.

N. Y., Niagara Falls — See "Contracts Awarded."

N. Y., North Tonowanda — See "Contracts Awarded."

N. Y., Salamanca—See "Contracts Awarded."

N. Y., Syracuse—See "Contracts Awarded."

O., Greenville—Feb. 14, by David Craig, genl. dir., completion sewage treatment plant. $153,242. H. P. Jones Co., Toledo, engr. P.W.A. project. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

Okla., Oklahoma City — See "Contracts Awarded."

Tex., Tyler—Feb. 14, by City, c/o A. H. Balch, mgr., sewer extension, incl. vitr. tile collecting system, manholes, cleanouts, c.i. force mains and 2 lift stations. $42,000. Hawley, Freese & Nichols, Capps Bldg., Fort Worth, engrs. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

Utah, Provo—See "Contracts Awarded."

LOW BIDDERS

★ **N. Y., Niagara Falls**—City, Jan. 31, constructing sewage disposal plant, system and tunnels, from F. S. Canuso & Son, 804 South 12th St., Phila., Pa., $1,268,000. Est. $2,000,000. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

CONTRACTS AWARDED

Ill., Algonquin — Village, general contract sewers and final tank equipment, to A. L. Jackson, 161 East Erie St., Chicago, $37,955 and $1,960 respectively•••slug conveyor, to Jeffrey Mfg. Co., East 1st Ave., Columbus, O., $1,910 •••aerators, to Simplex Ejector & Aerator Corp., 2400 West Madison St., Chicago, $750 •••2 pumps, to Yeomans Bros. Co., 1433 North Dayton St., Chicago, $926. Grand total $43,501. **P.W.A.** Bids Dec. 11, awarded Jan. 7. Noted Jan. 9, C. D.

Ill., Barrington—City, 65,000 ft. sewers, to Allied Bridge & Constr. Co., 201 North Wells St., Chicago, $115,570; sewage disposal plant, to A. L. Jackson Co., 161 East Erie St., Chicago, $129,254. Bids Jan. 10. **P.W.A.** Noted Dec. 12, C. D.—Dec. 19, E. N.-R.

Ill., Belvidere—City, constructing sewage disposal plant, to A. L. Jackson Co., 161 East Erie St., Chicago, $125,186; sewers, to J. W. Moore, 2112 Grant St., Evanston, $98,275. **P.W.A.** Bids Dec. 27. Noted Dec. 18, C. D.

Ill., Bradley—Village, sewers, to Lake State Eng. Co., 111 West Jackson Blvd., Chicago, $63,528; 60,000 gal. tank and tower, to Chicago Bridge & Iron Wks., 37 West Van Buren St., $6,925. Awarded Jan. 17.

★ **Ill., Chicago**—Sanitary Dist. of Chicago, 910 South Michigan Ave., constructing Southwest Side Intercepting Sewer. Contr. 5, to S. A. Healy Co., 610 West Van Buren St., $1,578,600. **P.W.A.** Bids Jan. 23. Noted Jan. 29, C. D.

Ill., Duquoin—City, A. F. Angel, mayor, constructing sewers, Div. A, to English Bros., Lincoln Bldg., Champaign, $21,226; sewage treatment plant, Div. B, to J. Mackler & Co., 86 Illinois St., Chicago Heights, $133,224. Bids Jan. 10. **P.W.A.** Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Ill., Elmhurst—Village, furnishing, installing 10,500 ft. 15- to 42-in. sewers, to Gjellefald Constr. Co., Forest City, $94,000. **P.W.A.** Bids Dec. 9. Noted Nov. 21, C. D.—Nov. 28, E. N.-R.

Ill., Gillespie—City, sewers and sewage disposal plant, to Gjellefald Constr. Co., Forest City. Est. about $90,000. **P.W.A.** Bids Dec. 10. Noted Nov. 15, C. D.—Nov. 21, E. N.-R.

Ill., Kankakee—City, constructing sewage disposal plant, to Nancini & Ventrella, 912 Taylor St., Chicago, $225,000; sewers, to H. C. Wildadsen Constr. Co., 105 Persimmon St., Peoria, $145,000. **P.W.A.** Awarded Jan. 11. Noted Dec. 11, C. D.

Ill., Kewanee — City, sewers, to Gjellefold Constr. Co., Forest City. Est. $204,000. **P.W.A.** Bids Dec. 9. Noted Dec. 6, C. D.—Dec. 5, E. N.-R.

Ill., Ladd — Village, 192,000 gal. per day sewage treatment plant, to H. P. Reger & Co., 115 East 72nd St., Chicago, $34,000. P.W.A. Bids Nov. 22. Noted Nov. 15, C. D.—Oct. 10, E. N.-R.

Ill., Lansing—Village, sewers, to Sides Co., Co., 844 North Rush St., Chicago, $72,[illegible]. **P.W.A.** Awarded Dec. 15.

Ill., LaSalle—City, constructing 4,000 ft. [illegible] in. concrete intercepting sewer, 5 ft. diam., to Trompeter Constr. Co., Peru, $82,000. [illegible] Dec. 4, awarded Dec. 9. Noted Dec. 3, C. D.

Ill, Lincoln—City, treatment plant, to J. Finley Coy., Bloomington. **P.W.A.** Bids Dec. [illegible].

Ill., Litchfield—City, sewage treatment plant, to Gjellefold Constr. Co., Forest City, $94,[illegible]. Bids Nov. 26, approved P.W.A. Dec. 12. P.W.A. Noted Nov 7, C. D.—Nov. 14, E. N.-R.

Ill., Rushville—City Council, sewerage system, to H. C. Willadsen Constr. Co., 105 Persimmon St., Peoria, $44,358. **P.W.A.** Bids Dec. 14. Noted Dec. 26, C. D.

Ill., Rushville—City, sewage disposal plant, to Sangamon Constr. Co., 523 Illinois Bldg., Springfield, $43,103. **P.W.A.** Bids Dec. 20. Wood, Wolraven & Tilly, 322½ South 6th St., Springfield, engrs.

Ia., Keystone—Town Council, sewage disposal plant, Sect. 3, to Hoak Constr. Co., 621 63rd St., Des Moines, $25,550. **P.W.A.** Bids Jan. 3.

Ia., Osceola—City, storm sewers, to American Paving Co., Des Moines, $16,780; sanitary sewers, to Dobbs & Humphrey, Lincoln, Neb., $35,780. **P.W.A.** Bids Jan. 2. Noted Jan. 3, C. D.

Ia., Staceyville—Town, constructing sewerage system, to Dan Christensen, Cedar Rapids, $21,737; disposal plant, to R. W. Scott Constr. Co., Albert Lea, Minn., $11,640. Est. $35,300. **P.W.A.** Bids Jan. 10. Noted Jan. 8, C. D.

Kan., Hutchison—City, H. P. Hurtz, constructing complete disposal plant, incl. trickling filter, sludge digestion, tanks, pumps and equipment, to C. L. Burke, Hutchison. $352,100. P.W.A. bids Jan. 7.

Mass., Gardner—City, R. Burns, W.P.A. administrator, City Hall, 409 ft., 4x5 ft., rein.-con. box culvert in Parker St., $15,267; 530 ft., 5x5 ft., rein.-con. box culvert at Pond Brook, $14,700, relief labor. **W.P.A.** Owner purchases materials.

Mass., Worcester—City, J. H. Brooks, Jr., supt. Sewer Dpt., 20 East Worcester St., furnishing, installing 2 pumping units at Lake View Sewage Pumping Station, to Yeomans Bros. Co., 1433 Dayton St., Chicago, Ill., $7,825. **P.W.A.** Bids Jan. 13, awarded Jan. 28. Noted Jan. 21, C. D.

Mo., St. Louis—Bd. P. Service, City Hall, constructing Sect. C-3, Downtown Relief Sewerage System, to Mid-West Constr. Co., 420 Security Bldg., $30,999. Est. $36,000. **P.W.A.** Bids Jan. 14. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

Mo., St. Louis—City, constructing and reconstructing open concrete section River Des Peres Drainage Works, day labor. $100,000. L. A. Pettus, city engr.

N. J., Beverly City—City, reconstructing and improving sewage treatment works and disposal plant, relief labor. $26,730. **W.P.A.** M. W. Murphy, State and Montgomery Sts., Trenton, W.P.A. engr.

N. J., Phillipsburg—Town, constructing rein.-con. box storm sewer, relief labor. $24,782. **W.P.A.** J. F. Moroney, 2 Park Square, Morristown, W.P.A. engr.

N. Y., Amsterdam—City, constructing storm sewers in Henrietta Blvd., Howard and Evelyn Aves. from Wilkes Ave. to Weslyan Ave., relief labor. $300,000. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, Procurement Officer W.P.A. will purchase materials.

N. Y., Buffalo—City, reconstructing and extending storm water sewers in DeWitt and Bradley Sts., own forces. $68,000. **W.P.A.** H. F. Burd, Procurement Officer W.P.A., 1014 City Hall, will purchase materials.

N. Y., Highland Falls—Village, sewerage system, Contr. 1, to Cestone Bros., 21 Cliff St., Verona, N. J., $197,350; sewage treatment plant and pumping station, Contr. 2, to J. P. Burns, Knickerbocker Rd., Creskill, N. J., $34,938. **P.W.A.** Bids Jan. 16. Noted Jan. 21, C. D.

N. Y., Lockport—City, constructing 12 in. sewer in Mill St. from Portage to William Sts., $15,000; 6 in. water line and 10 in. sewer in South Transit St., $7,000; 6 in. water line and 10 in. sewer in Ontario St., $6,000; 6 in. water line and 10 in. sewer line in Hawley St., $4,500, relief labor. Total $32,500. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, Procurement Officer W.P.A. will purchase materials.

N. Y., Newark—See "Waterworks."

N. Y., Niagara Falls — City, storm water sewers in Frontier and Lindburgh Aves., 76th, 77th, 78th and 79th Sts., $115,000; in Hyde Park, Frontier and Wheatfield Aves., alley between LaSalle and Woodlaw Aves., $37,000, relief labor. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, Procurement Officer W.P.A. will purchase materials.

N. Y., North Tonowanda—City, storm water sewer extensions in Gilmore, 12th and Erie Aves., Carr, Stencil and Division Sts., relief labor. $32,000. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, procurement officer, W.P.A. will purchase materials.

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†*Federal Government.*

sewerage, etc. (Continued)

N. Y., Salamanca—City, constructing sanitary sewers in 4 streets, day labor. $25,688. C. C. Cheney, city engr.

N. Y., Syracuse—City, cleaning and inspecting all main sewers in 2nd, 3rd, 4th and 5th Wards, relief labor. $25,000. W.P.A. funds allotted.

N. C., Hemp—Town, constructing sewers, to E. W. Grannis, Fayetteville, $35,795***waterworks to Reed & Abee, Inc., Asheville, $15,392 ***tower and tank, to R. C. Cole Mfg. Co., Newnan, Ga., $7,894***valves, to R. D. Wood Pipe & Fdry. Co., Lynchburg, Va., $1,419*** pipe, to Glamorgan Pipe & Fdry. Co., Richmond, Va., $13,590. Grand total $74,090. **P.W.A.** Bids Jan. 6. Noted Jan. 16, C. D.

O., Akron—City, sewer in Copley Rd., from Trigonia to Briarwood Aves., to Fonaro Co., Cleveland, $26,198. Est. $27,094. **P.W.A. A.** B. Beckherms, Akron, engr.

O., Columbus—City, sewage treatment plant, Contr. 12, mechanical screens, to Jeffrey Mfg. Co., East 1st Ave., $9,385. **P.W.A.**

O., Columbus — City, constructing sewers, Contr. 63, to R. J. Dienst, 297 South High St., $26,243. **P.W.A.** Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

O., McComb—City, sewers and sewage treatment plant, Contrs. 1 and 2, to G. L. LaBoiteaux & Henry F. Bosshard, 4926 Louis Ave., Toledo, $50,294. **P.W.A.** Noted July 24, C. D.—Aug. 1, E. N.-R.

Okla., Oklahoma City — City, 11,000 lin.ft. 15 in. main sanitary sewer in Drexel Ave., $32,000, and 12,600 ft. 8- to 18-in. vitr. clay main sewer in South Bway., $27,000, by force account. **W.P.A.** L. M. Bush, city engr.

Utah, Provo—City, constructing 35,000 lin. ft. 6- to 12-in. vitr. tile sewer drains, relief labor. $78,000. **W.P.A.** E. Jacobs, city engr.

Wis., Madison—City, pumping equipment for sewers, Div. G, to Dayton-Dowd Co., Quincy, Ill., $9,737***pumping equipment, Div. H, to Allis Chalmers Mfg. Co., 1126 South 70th St., Milwaukee, $44,091***general contract constructing sewers, Div. J, to G. Neilson & Son, Madison, $44,148. Grand total $97,976. Bids Jan. 8.

Wis., Oshkosh—City, constructing intercepting sewer in High St. and Sawyer Park, to G. E. Zimmermann Co., 3402 West Wisconsin Ave., Milwaukee, $71,978 and $52,551. **P.W.A.** Bids Jan. 10. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Conn., Bridgeport—City, J. McLevy, mayor, making plans replacing 6 bridges over Rooster River, at Laurel Ave., Aldine Ave., Arcadia St., Capitol Ave. and Anton St., and Hughes Ave., each 50 ft. span, 24 ft. wide; rein.-con. construction. Est. materials $19,800, labor $37,979. Total est. $57,778. F. Toquet, City Hall, engr.

★ **Ill., Chicago**—Chicago Park System, Burnham Park, plans 125 ft. rein.-con. bridge over entrance to Jackson Park Yacht Harbor, $500,000. P.W.A. funds applied for. Plans constructing new yacht harbor lakeward of proposed bridge. J. W. Black, Burnham Park, engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 1 rein.-con. pipe and 1 rein.-con. box culvert on Primary Rd. 25, Creston, Union Co., incl. 180 cu.yd. Class 1 excav., 80 cu.yd. fill; one 39 ft. I-beam undergrade crossing span, incl. 800 cu.yd. Class 1 excav., 2 rein.-con. box culverts, 165 cu.yd. Class 1 excav., on same road; 1 rein.-con. box culvert, 1 rein.-con. box culvert extension, and 1-rein.-con. pipe culvert on U. S. Rd. 39, in Scranton, Greene Co., 55 cu.yd. Class 1 excav.; 5 rein.-con. pipe and 15 rein.-con. box culverts, 584 cu.yd. Class 1 excav., and one 50x24 ft. I-beam bridge, 100 cu.yd. Class 1 and 180 cu.yd. Class 2 excav. on relocation of U. S. Rd. 6, Davenport, Scott Co. F. R. White, Ames, state hy. engr.

Iowa—State Hy. Comn., Ames, made plans and soon takes bids constructing one 150x24 ft. continuous I-beam bridge on Primary Rd. 182, northwest of Lansing, Allamakee Co., incl. 145 cu.yd. Class 1, 90 cu.yd. Class 2 and 44 cu.yd. channel excav.; 20 rein.-con. pipe and 19 rein.-con. box culverts on Primary Rd. 175, from Jewell east through Ellsworth and Radcliffe, Hamilton and Hardin Counties, incl. 1,771 cu.yd. Class 1 excav. and 2,340 cu.yd. fill; 2 rein.-con. pipe and 2 rein.-con. pipe culverts on relocation Primary Rd. 175 from U. S. Rd. 65, Hardin Co., incl. 105 cu.yd. Class 1 excav. and 600 cu.yd. fill. F. R. White, ch. engr.

★ **Massachusetts** — Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, plans grade crossing elimination construction projects, Main St., Wilmington, $140,000; Willow St., Reading, $10,000; Rosemont St., Haverhill, $75,000; Elm St., Braintree, $400,000; Paradise Rd., Swampscott (reconstruction), $50,000; Essex St., Swampscott (reconstruction), $60,000. Total $735,000. **Maturity indefinite.**

Missouri and Kansas — Missouri State Hy. comn., Jefferson City, and Kansas State Hy. Comn., Topeka, Kan., soon takes bids constructing 8,020 ft. Intercity Viaduct over Kansas River and railroad tracks between Kansas City, Mo., and Kansas City, Kan. Ash, Howard, Needles & Tammen, 1012 Baltimore Ave., Kansas City, Mo., engrs.

Mo., Kansas City—City and State Hy. Dpt., Jefferson City, made plans rein.-con. steel bridge over Burlington R.R. tracks. $25,000. R. Woddell, city engr.

Neb., Grand Island—State Hy. Dpt., Lincoln and City of Grand Island plan constructing viaduct over Union Pacific R.R. W. Wheeler, city engr. City will hold special election to vote bonds for payment of damages to abutting property owners.

Neb., Grand Island—City defeated $25,000 bonds for constructing overpass. Noted Jan. 29, C. D.

New York—Bd. Supervs. Cortland Co., Cortland, bids early in spring, constructing 2 bridges between Cincinnatus and Gee Brook, $31,000; and steel, concrete bridge between East Homer and Truxton, $32,000. W. Dwyer, co. engr. Bureau P. Roads, Wash., D. C., approved project.

N. Y., Lansing—Bd. Supervs. Tompkins Co., Ithaca, bids in spring, constructing steel, concrete bridges and approaches between South and North Lansing, $25,000. Bureau P. Wks., Wash., D. C., approved project.

N. Y., Tannersville—Bd. Supervs. Greene Co., Catskill, bids in spring, constructing steel, concrete bridges and approaches between Stony Grove and Tannersville, $65,000.

N. Y., Tuckahoe—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, plans eliminating grade crossing at Crestwood Ave., $350,000-$500,000. Village will do preliminary work as W.P.A. project.

N. Y., White Plains—Westchester Co. bids in spring, constructing steel, concrete bridge between White Plains and East View. $50,000. Bureau P. Roads, Wash., D. C., approved project.

★ **North Carolina** — State Hy. & Pub. Wks. Comn., Raleigh, plans program underpass and overhead for grade crossing eliminations, $1,478,000, consisting of Projects 7540 Stokes County between Rural Hall & Pilot Mountain Atlantic Coast Line, 4 structures, $140,000*** 6124 Anson County in Morven, Atlantic Coast Line overhead, $85,000***2180, Duplin County in Calypso, Overhead Atlantic Coast Line, $58,000***2841, Wayne County, St. George St. in Goldsboro, overhead. A. C. L., $65,000***1854, Pitt County underpass, Norfolk & Southern, Greenville, $81,000***1963, Washington relocation in Plymouth, Norf. & Southern, $40,000 ***6488, Mecklenburg Co., overhead S. A. L., North Graham St., Charlotte, $29,000***8212, Cleveland Country, overhead, Southern R.R., Kings Mountain, $69,000***7432, Forsyth County, overhead, Winston Salem South Bound R.R., Sprague, Winston Salem, $12,000***1635, Edgecombe and Nash Counties, underpass, A. C. L. R.R., Jordan St., Rocky Mount, $130,000***5343, Guilford County, overhead, Atlantic & Yadkin, Gaston St. in Greensboro, $37,000*** 4759, Wake County, underpass, Norfolk & Southern, Cabarrus St. in Raleigh, $47,000*** 4784, Wake County, overhead, Norfolk & Southern in Varina, $21,000***County Project 303, Wake, overhead, Norfolk & Southern, Munford Ave., Raleigh, $44,000***4110, Durham County, underpass, Norfolk & Western, Trinity Ave., Durham, $54,000***4692, Vance County, underpass, S. A. L. R.R., Charles Street Exts., Hederson, $95,000***7440, Forsyth County, overhead, Southern R.R., 9th St., Winston Salem, $20,000***County 451, Mecklenburg County, underpass, Southern R.R., West 6th St., Charlotte, $117,000***6528, Mecklenburg County, underpass, Southern R.R., South Graham St. in Charlotte, $90,000***1395, Halifax County, underpass, Atl. Coast Line, south of Halifax, $50,000***County 304, Wake, overhead, Norfolk & Southern near Raleigh Airport, $21,000 ***5243, Davidson, overhead, Winston Salem, S. B. near Junior Order Home, $49,000***4475, Lee County, overhead, S. A. L. between Tramway and Jonesboro, $32,000***6660, Richmond County, underpass, S. A. L. east of Hamlet. W.P.G.A. project.

O., Cleveland—Bd. Comrs. Cuyahoga Co., G. H. Stahler, clk., making plans for steel, concrete bridge over Pittsburgh & Lake Erie R.R. $45,000. J. O. McWilliams, Standard Bldg., co. engr.

Pa., Scranton—City, W. A. Schunk, dir. P. Wks., preliminary plans steel, concrete bridge to connect Scranton and West Scranton at Spruce St.; also reconstructing present Linden St. viaduct, $350,000. A. B. Cohen, consult. engr., 1 Madison Ave., New York.

Texas—State Hy. Comn., H. Hinez, chn. Hy. Comn., Austin, soon takes bids constructing Gulf, Colorado & Santa Fe R.R. overpass, approaches and iron ore topsoil base and road oil surface treatment Hy. 149, WPGS 837, Panola Co.; K. C. M. and O. R.R. underpass and approaches, concrete paving on Hy. 3, W.P.G.M. 664-F, Brewster Co., $110,000 (new P.W.A. project); steel, concrete bridges over Greenbriar Creek and Coryell Creek, on Hy. 7, F.A.P. 601-E, Coryell Co., $60,000; Barons Creek Bridge and approaches on Hy. 20, F.A.P. 46-B, reopened, Gillespie Co., $39,000.

Texas — State Hy. Comn., H. Hines, chn., Austin, made plans replacing section of steel, concrete bridge over Red River, on Hy. 30, ERP 4, Sect. 3 H.C., Witchita Co. G. Gilchrist, Austin, hy. engr.

(Federal Government.

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Bridges, etc. (Continued)

Tex., Galveston—State, Atchison, Topeka & Santa Fe R.R., G. W. Harris, ch. engr., Chicago, Ill., Galveston County, preliminary surveys constructing rein.-con. overpass over Santa Fe tracks at approach to new causeway to be built. $450,000. C. C. Washington, Galveston, engr. Galveston Co.

Washington—State Hy. Dpt., Olympia, plans bridge on Pacific Hy. north of Mt. Vernon. $200,000. Will be undertaken shortly if federal funds forthcoming. L. V. Murrow, hy. engr.

Wis., West Allis—Common Council voted to construct new bridge over Northwestern R.R. tracks at South 92nd St. W. D. Darby, city engr.

BIDS ASKED

Conn., Bridgeport—See "Contracts Awarded."

Idaho—Feb. 14, by G. E. McKelvey, comr. P. Wks., Boise, constructing 3 concrete bridges, concrete culvert, on 0.032 mi. Coeur d'Alene-Yellowstone Trail, from Mullan east. Shoshone Co., incl. 1,790 cu.yd. excav.; 272 ft. concrete, steel overhead, and grading, surfacing 0.39 mi. approaches of Roosevelt Hy., American Falls, Power Co., incl. 8,500 cu.yd. unclassified excav.

Louisiana—Feb. 19, by State Hy. Comn., Baton Rouge, constructing Bayou Pierre Part Bridge 104 ft. I-beam hand-operated swing span, on Paincourtville-Pierre Part Hy., Assumption Parish, Project 1302; constructing Bayou Nex Pique Bridge and approaches, 120 ft. I-beam hand operated swing span, etc., on the Jennings-Iota Hy., Jefferson Davis and Acadia Parishes.

Maine—Feb. 11, by State Hy. Comn., Augusta, reconstructing Bessey Bridge, Union, 960 cu. yd. rein.-con. structure, 68 tons steel superstructure. To exceed $30,000. L. D. Barrows, Augusta, engr.

New Jersey—Feb. 17, by E. D. Sterner, comr. State Hy. Dpt., Trenton, constructing bridge across Passaic River on Route 6, Sect. 7, in Passaic and Bergen Counties, incl. 8,086 cu.yd. excav., 870,000 lb. reinforcing steel; bridge across Terrace Ave. and one across Route 2, South on Route 6, Sect. 7, Bergen Co., 2,423 cu.yd. excav., 268,000 lb. structural steel, 165,000 lb. reinforcing steel; bridge across Grandview Blvd., Route 6, Sect. 7, Bergen Co., 1,259 cu.yd. excav., 103,000 lb. reinforcing steel, 220,400 lb. structural steel; bridge across Saddle River and one across Main St. on Route 6, Sect. 7, Bergen Co., 2,845 cu.yd. excav., 115,850 lb. reinforcing steel, 378,500 lb. structural steel; bridge to carry Route 6, Sect. 7, across tracks of Bergen Co. branch Erie R.R., Bergen Co., 1,212 cu.yd. excav., 462,000 lb. structural steel, 212,000 lb. reinforcing steel.

New York—Feb. 13, by Triborough Bridge Authority, 111 8th Ave., New York, end ramp and paving Bronx approach for Triborough Bridge, connecting Manhattan, Bronx and Queens Boros, Contr. 58. P. Loeser, dir.

★ **New York**—Feb. 25, by A. W. Brandt, comr. Hys., Albany, constructing 38 ft. I-beam bridge on 0.04 mi. Smithville-Flats-McDonough Rd., WPSS 1827, Chenango Co., $31,370; 30 ft. I-beam span and approaches on Long Pond-Smithville Flats Rd., SH 5260, RC 2366 and ER-RC 3724, Chenango Co., $22,408; 80 ft. plate girder and 120 ft. truss, on 0.51 mi. Franklin-North Franklinville Rd., SH 8288, and Franklin-Unadilla Rd., Part 1, RC 267 and ER-RC 3725, Delaware Co., $121,464; 34 ft. concrete bridge on 0.72 mi. Poughkeepsie City-Hooker Ave. Rd., WPMS C-36-11, Dutchess Co., $107,144***54 ft. girder carrying Erie R.R. on 0.04 mi. Dykes Crossing SH 5504, WPGS 916-A, Rockland Co., $36,432; 30 ft. I-beam bridge on Cameron Mills-Risingville Rd., 77 ft. South Hill-Boyds Rd., 20 ft. slab culvert on Red Spring-Run Rd., Culvert 66 on Hammer Creek Rd., Culverts 80 and 80A, Slate Creek Rd., 19 ft. slab Culvert 82, Webb Hollow Rd., 87 ft. timber trestle Bridge 100, Babcock-Hollow Rd., WPSO 949-A, WPSO SS 36-8, Steuben Co., $67,996***70 ft. rigid frame bridge on 0.17 mi. Hornell Big Creek SH 513 ER2-B, Hornell Big Creek Rd. and Hornell Arkport Rd., Steuben Co., $42,160; two 24 ft. and 20 ft. concrete slab bridges, on Barrows Rd., and on Rawson Hollow Rd., and Culvert 6 on Rockefeller Rd., WPSO SS 36-9, Tioga Co., $25,313***71 ft. girder bridge over L. V. R.R., on 0.46 mi. Varna Crossing SH 5225, WPGH RC 3727, Tompkins Co., $133,412; 83¼ ft. girder with two 10½ ft. approach spans, Portchester-Village Main St. Rd. SH 5662, Westchester Co., $151,438. Total $739,127.

N. Y., Binghamton—City bids about Feb. 15, reconstructing bridge at Ferry St., $360,662. P.W.A. project. A. B. Cohen, 1 Madison Ave., New York, engr. Noted Sept. 25, C. D.—Oct. 3, E. N.-R.

Ohio—See "Streets and Roads."

CONTRACTS AWARDED

Alabama—State Hy. Comn., c/o G. Scott, pres., Montgomery, concrete overhead and approaches 0.465 mi. 2nd Ave., Opelika, WPGM 16 C, Lee Co., to Couch Constr. Co., Dothan, $139,883. Bids Oct. 25.

Colorado—See "Streets and Roads."

Connecticut—J. A. Macdonald, state hy. comr., Hartford, constructing twin 55 ft. span concrete encased girder bridge and rolled gravel approaches at Quinnipiac River on Sackett Point Rd., North Haven, to Mariani Constr. Co., 22 Forbes Ave., New Haven, $33,7[illegible]*** constructing 221 ft. Parker Truss Bridge over Quinnepaug River, and gravel approaches, Canterbury, to A. I. Savin Constr. Co., 10 Village St., East Hartford, $66,471. Bids Dec. 7 and 9 respectively. Noted Dec. 13, C. D.

Conn., Bridgeport—City, P. Brewster, dir. P. Wks., replacing wooden bridge with 50 ft. span rein.-con. bridge, Island Brook Ave., W.P.A. labor. $26,512. F. Toquet, City Hall, Bridgeport, engr.

Ill., Chicago—Bd. Local Impvts., City Hall, constructing 415 ft. rein.-con. trestle and 410 ft. filled approaches to Hickory Street Viaduct, to M. J. Boyle & Co., 1742 Mozart St., $199,679. P.W.A. Awarded Jan. 6.

Ill., Chicago—Chicago Park Dist., Burnham Park, constructing foundations under the parks south half of New East Randolph Street Viaduct, to Mackie-Thompson-Tamm, Inc., 228 North LaSalle St., $174,840. P.W.A. Bids Dec. 10. Noted Dec. 18, C. D.

Indiana—State Hy. Comn., Indianapolis, 60 ft. rein-con. arch bridge over Deep River, Lake and Porter Counties, to J. E. Sweet & Sons, Woodburn, $33,360 est. $42,166. Bids Dec. 10. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

Iowa—State Hy. Comn., Ames, 21 concrete box and 2 concrete flume culverts in Allamakee Co., to C. R. Yegge, Boone, $24,186***continuous I-beam highway grade separation structure, multiple span overpass, in Carroll Co., to Jensen Constr. Co., Kimballton, $73,309*** 1 concrete culvert, in Cherokee Co., to Graves Bros. Constr. Co., Melvin, $1,822***8 concrete box, 14 concrete pipe and 1 arch culvert in Davis Co., to G. Jordan & Sons, Centerville, $6,616***multiple span overpass in Fremont Co., to Council Bluffs Constr. Co., Council Bluffs, $7,426. Grand total $113,649. Bids Jan. 7, awarded Jan. 23. Noted Jan. 14, C. D.—Jan. 2, E. N.-R.

Ia., Waukon—See "Streets and Roads."

Mass., Boston—City, Dpt. P. Wks., C. J. Carven, comr., pile, timber water pipe trestle and fender at Chelsea Bridge North, to Roy B. Rendle & Co., Inc., 364 Border St., East Boston, $24,200. P.W.A. Bids Jan. 21, awarded Jan. 28. Noted Jan. 27, C. D.

Minnesota—State Hy. Comn., St. Paul, 231 ft. Bridge 5610, 12 mi. southeast of Ely, in Lake Co., to L. M. Faller, Rochester, $44,290. Bids Jan. 17. Noted Jan. 13, C. D.

Mo., St. Francisville—Special Road Dist. 1, Clark Co., c/o W. Orr, secy., Alexandria, constructing rein.-con. steel bridge over Des Moines River at Market St., to F. W. Whitehead, Kahoka, $128,637. Est. $119,479. P.W.A. Bids Jan. 9. Noted Jan. 6, C. D.

New Hampshire — Engineering Service & Constr. Co., general contractors, 161 Devonshire St., Boston, Mass., structural steel for bridge over Boston & Maine R.R., Hampton, Rockingham Co., to Boston Bridge Wks., Inc., Binney St., Cambridge, Mass., for State Hy. Dpt., Patriot Bldg., Concord. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

New Jersey—Franklin Contg. Co., general contractors, 20 Washington Pl., Paterson, 130 tons reinforcing steel for new bridge at South Amboy, for State Hy. Dpt., Trenton, to Igoe Bros., 234 Poinier St., Newark. Noted Dec. 20, C. D.—Dec. 27, E. N.-R.

N. J., Belmar—Monmouth Co., Court House, Freehold, exploratory borings for new bridge between Belmar and Avon, to J. D. Smith, Perth Amboy, $777. Total est. $316,364. P.W.A. Noted Jan. 3, C.D.—Jan. 9, E.N.-R.

New Mexico—See "Streets and Roads."

★ **New York**—A. W. Brandt, comr. Hys., Albany, timber trestle in Chenango Co., to Standard Eng. Co., 444 Bway., Albany, $20,736***140 ft. truss bridge in Greene Co., to M. R. Ingraham, Inc., 444 Bway., Albany, $50,673 est. $59,627***bridges in Cortland Co., to Serafini Constr. Co., Inc., Binghamton, $46,939 est. $54,326***20 ft. concrete bridge in Rensselaer Co., to Collins Bros., Mechanicville, $46,608 est. $56,779***bridge in Schuyler Co., to H. J. Suits, Watkins Glen, $38,996 est. $50,929***rigid frame bridge in Tompkins Co., to Bero Eng. & Constr. Co., North Tonawanda, $20,845 est. $22,259***grade crossing elimination in Westchester Co., to A. E. Ottaviano Inc., Croton-on-Hudson, $122,473 est. $160,390 ***improving 0.22 mi. road Westchester Co., to Peckham Road Corp., White Plains, $39,339 est. $48,632***1.06 mi. road in Erie Co., to A. R. Menzies, Kenmore, $43,582 est. $54,432. Grand total $430,211. Bids Jan. 7. Noted Jan. 17, C. D.—Dec. 23, E. N.-R.

New York—Lake Champlain Bridge Comn., Municipal Bldg., Rouses Point, constructing west embankment of Rouses Point Bridge from Rouses Point, N. Y., to Alburg, Vt., to T. F. Cunningham, Ticonderoga, $35,750. P.W.A. Bids Jan. 13. Noted Jan. 16, C. D.—Jan. 16, E. N.-R.

Ohio—See "Streets and Roads."

Oregon—State Hy. Comn., Portland, constructing undercrossing Marion Co., to Kern & Kibbe, 42 Southeast Salmon St., Portland $256,502. Bids Jan. 10. Noted Jan. 16, C. D.—Jan. 2, E. N.-R. under "Streets and Roads."

Oregon—See "Streets and Roads."

Vermont—A. L. Phelps, Inc., general contractors, 496 Bridge St., Springfield, Mass., struc-

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†*Federal Government.*

Bridges, etc. (Continued)

tural steel for bridge on U. S. Route 7, Dorset, to Boston Bridge Wks., Inc., Binney St., Cambridge, Mass., for State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier. Noted Nov. 27, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

Washington—See "Streets and Roads."

Wash., Mount Vernon—Skagit Co., constructing bridge over Swinomish Slough, to Manson Constr. & Eng. Co., Canadian National Dock, Seattle, $117,753. Est. $100,638. R. E. L. Knapp, Court House, engr.

Que., Ste Anne de la Perade—Dpt. P. Wks., Quebec City, 642 ft. steel bridge, 30 ft. over St. Anne River, to Dominion Bridge Co., Lachine, $107,650. Noted Mar. 26, C. D.—Mar. 28, E. N.-R.

STREETS AND ROADS

BIDS ASKED

Arizona—State Hy. Comn., Phoenix, bids about Feb. 17, grading, draining 19.6 mi. Show-low-Concho Hy., Apache Co. $127,323. T. S. O'Connell, state hy. engr.

†**Arizona**—Pub. Rds. returned unopened bids to have been opened Dec. 17, bituminous treating 25.277 mi. Kingman Boulder Dam Hy., Mohave Co. New bids will be taken in future by State Hy. Dpt.

Ariz., Tucson—City soon takes bids cut back and emulsified asphalt paving 35 blocks in Menlo Park Dist. $35,063. P.W.A. project. B. Metcalfe, city engr.

Colorado — State Hy. Dpt., Denver, did not open bids Jan. 28, gravel surfacing 6.2 mi. hy. between Salida and Canon City on State Hy. 6, FAP 113-E and F.L.H.P.2-C, Fremont Co. Will readvertise. Noted Jan. 21, C. D.

Kansas—Feb. 15, by State Hy. Comn., at office of County Clerk, Troy, resurfacing, concrete paving, light type surfacing earthwork, culverts, curbing, guttering, 91.809 mi. hys. in Brown, Doniphan, Marshall, Riley and Pottawatomie Counties.

N. Y., Falconer—See "Contracts Awarded."

N. Y., Hamburg—See "Contracts Awarded."

N. Y., Malone—See "Contracts Awarded."

N. Y., Warsaw—See "Contracts Awarded."

Ohio—J. J. Jaster, Jr., Ohio Hy. Dir., Columbus, improving roadside, part Sect. C, part Hamilton Sect., Hamilton Cleves Rd., Butler Co., part Sect. M, part Monroeville, Sect. Bellevue-Norwalk Rd., Huron Co., and Medina Sect., East Akron-Medina Rd., Medina Co., one bid received, not opened***improving roadside part Sect. B-1, part Sect. B-2, Cleveland-Canton Rd., Guyahoga Co., Sect. A, Toledo Western Rd., Lucas Co., part Sect. C, Maumee Northern Rd., Lucas Co., two bids received, and not opened. Noted Jan. 13, C. D.—Jan. 23, E. N.-R.

Ohio—Feb. 11, at office J. J. Jaster, Jr., dir. hy. dpt. Columbus, grading, drainage structures, retaining walls, concrete paving 0.88 mi. Sect. Chesapeake and part Sect. O of Ohio River Rd. Route 7, Lawrence Co., $107,156***grading, traffic bound paving, constructing 3 span timber bridge over Huff Run, 0.084 mi. Tuscarawas Co., $4.789***grading, drainage structures, traffic bound paving, 0.383 mi. New Cumberland Station Sherrodsville Rd. County Rd. 318-f, Warren Twp. Tuscarawas Co., $15,486***grading, drainage, cold mixed paving 2.943 mi. Sect, b-1 part Sect. Marysville, Marysville Kenton Rd. State Route 31, Paris Twp., Union Co., $124,464.

Pa., Portage—See "Contracts Awarded."

Pa., Red Lion—See "Contracts Awarded."

Rhode Island—Feb. 10, by Bd. Contracts, Standards & Purchases, at office State Purchasing Agent, Providence, rein.-con. paving 1.041 mi. East Main Rd., Portsmouth, WPH 52-D, Contr. 3509, Newport Co.; mixed in place Type "F," Class "C" gravel pavement 1.202 mi. Buck Hill Rd., WPSO 124, Burrillville, Contr. 3520, Providence Co.; 1.353 mi. mixed in place Type "D," Class "C" gravel pavement Ross Hill Rd., Westerly, WPSO 10-B, Contr. 3522, Washington Co.; pre-mixed bituminous course gravel pavement Type "G," Class "C," 1.141 mi. Tucker Rd., Gloucester, WPSO 122, Contr. 3523, Providence Co.

Utah, Ogden—See "Contracts Awarded."

†**Virginia**—Feb. 27, by Pub. Rds., Dpt. Agriculture, Shenandoah Life Insurance Bldg., Roanoke, constructing 9.82 mi. road in Shenandoah Natl. Park from Simmons Gap to Brown Gap, Albermarle, Green and Rockingham Counties, incl. 500,500 cu.yd. excav. H. J. Spelman, dist. engr.

CONTRACTS AWARDED

Colorado—State Hy. Dpt., Denver, gravel surfacing 4.814 mi. hy. between Sapinero and Cimarron on State Hy. 6, Project 260-D, Gunnison Co., and constructing 0.347 mi. overhead railroad crossing in city of Grand Junction, on South 5th St., Project MPGM 299-C, Mesa Co., to C. A. Switzer, Arvada, $124,833 and $203,-755 respectively. Noted Jan. 8 and 20, C. D.

Colorado—State Hy. Dpt., Denver, gravel surfacing 0.857 mi. F.A.P. 351-A, 149 DR-2, and 149-GR-2, Adams and Arapahoe Counties, to Monarch Eng. Co., West Colfax and Larimer Sts., Denver, $9,993; 6.362 mi. hy. between Glenwood Springs and Basalt on State Hy. 82, WPSS 366-C, Garfield Co., to J. B. Claybaugh and C. V. Hallenbeck, Grand Junction, $67,661. Bids Jan. 20, awarded Jan. 28. Noted Jan. 27, C. D.

Connecticut—State Hy. Comn., J. A. Macdonald, hy. comr., Hartford, waterbound macadam paving 3,781 ft. Johnson Rd., Canaan, to John De Michiel & Bros., Inc., 58 High St., Torrington. Est. exceeds $25,000. P.W.A. Bids Nov. 18. Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

Ill., Carlisle—Dpt. P. Wks. & Buildings, Div. Hys., stabilized surface course 2.8932 mi. Sect. 3-3 MFT, near Bunker Hill, to Madison Constr. Co., Edwardville, $24,888; 4.018 mi. Sect. 5-5 MFT, near Virden, to O'Connor Constr. Co., Springfield, $33,936. Bids Dec. 5.

Ill., Chicago—See "Bridges and Grade Crossings."

Ill., Pekin—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, to Jansen & Shaefer, Pekin, concrete paving 0.5703 mi. Sect. 3-CS, $58,386; 0.91 mi. Sect. 3-CS, Part B, $25,359; 1.2369 mi. Sect. 5-CS, Part1, $43,960; and 0.6145 mi. Sect. 5-CS, Part 2, $21,913. Grand total $149,-618. Bids Dec. 11.

Indiana—State Hy. Comn., State House Annex, Indianapolis, crushed stone surfacing 6.739 mi. roads in Warrick and 6.619 mi. in Gibson and Warrick Counties, to R. P. Oblinger, Huntingburg, $87,880 and $86,947 respectively, est. $123,876 and $117,639 respectively***graveling 6.021 mi. Fulton and Wabash Counties, to Rosenberry & Gunsaullus, Inc., Butler, $96,047 est. $108,721. Grand total $270,874. P.W.A. Bids Dec. 3. Noted Dec. 10, C. D.—Nov. 28, E. N.-R.

Indiana — State Hy. Comn., Indianapolis, crushed stone surfacing 3.573 mi. Lawrence Co., to K. Killman, Salem, $88,680 est. $125,-416; concrete paving and bituminous treating 0.655 mi. road in Jay Co., to C. G. DeBolt Constr. Co., Northwest 5th and F Sts., Richmond, $4,559 est. $5,071. Bids Dec. 17. Noted Dec. 19, C. D.—Dec. 5, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, grading, structures, 6.783 mi. road in Lake and Porter Counties to R. Myers, Campellsburg, $118,-677 est. $132,619***graveling 11.352 mi. road in White and Pulaski Counties, to Gast Constr. Co., Warsaw, $103,200 est. $149,647. P.W.A. Bids Dec. 17 Noted Dec. 19, C. D.—Dec. 5, E. N.-R.

Indiana — State Hy. Comn., Indianapolis, waterbound macadam paving and graveling 8.407 mi. road in Hendricks Co., to J. C. O'Connor & Sons, Inc., 2104 Miner Ave., Fort Wayne, $117,026. Est. $119,661. Bids Jan. 7. Noted Jan. 10, C. D.

Iowa—State Hy. Comn., Ames, paving 1.393 mi. Cherokee Co., to Jensen & Krage, Sioux City, $55,423***grading 8.432 mi. Allamakee Co., to Nolan Bros., Inc., 18 North 2nd St., Minneapolis, Minn., $118,978***0.987 mi. Carroll Co., to Western Asphalt Paving Co., Sioux City, $26,848***3.894 mi. Davis Co., to R. J. Ryan, Inc., Ottumwa, $16,517***0.334 mi. Fremont Co., to G. W. Condon Co., 208 Grain Exchange Bldg., Omaha, Neb., $28,909***7.289 mi. Wapello Co. and 10.116 mi. Davis Co., to Roadmix Constr. Co., Shenandoah, $6,815 and $7,320 respectively***0.255 mi. Guthrie Co., to Wright Constr. Co., Des Moines, $11,373***0.57 mi. Mitchell Co., to McKenzie & Holm, Waterloo, $21,040. Grand total $293,233. Bids Jan. 7, awarded Jan. 23. Noted Jan. 14, C. D.—Jan. 2, E. N.-R.

Ia., Waukon—Allamakee Co., grading 8.4 mi. Highway 182, to Nolan Bros., 18 North 2nd St., Minneapolis, Minn., $118,977; culverts, to R. Yegge, Boone, $24,185. Jan. 15.

Kan., Winfield—City, 7 in. rein.-con. paving 12 blocks, to Cement Asphalt Products Co., Winfield, $30,090. R. B. Reeves, Winfield, engr.

Minnesota—State Hy. Dpt., St. Paul, improving State Project 33-164-21-1A and B and 2A and B, and S.P. 33-35-55-22 WPH 535A, WPGM 535B, WPMH 229E and NRM 229D, between Cloquet and Saginaw, to R. Maturi & Co., Chisholm, $123,107. Bids Dec. 20. Noted Dec. 11, C. D.

Minnesota—State Hy. Dpt., St. Paul, improving 0.9 mi. State Project 23-23-30-C, D and E, WPHG 257C, WPHG 257D and WPMH 257E, at Brook Park, to Young-Connelly Co., 2505 University Ave., St. Paul, $24,378***7.107 mi. State Project 28-28-26-3 and S.P. 28-28-26-2A and B, F.A.P. 240, between Graceville and east county line, to Thornton Bros., 1343 Dayton Ave., St. Paul, $61,684***20.5 mi. S.P. 12-26-24-2, 3 and 4, and S.P. 12-26-25-1A, F.A.P. 401C, F, I and H, between Ortonville and 20.5 mi. east and 20.5 mi. S.P. 12-26-25-1B, S.P. 12-26-25-2A and B and S.P. 12-26-23-1A and B, F.A.P. 401-H, D, E, B and A, east of Ortonville and 2 mi. west of Benson, to H. M. Jones, Randall, $15,713 and $15,212, respectively. Grand total $116,987. Bids Jan. 17. Noted Jan. 10, C. D.

★ **Montana**—State Hy. Comn., Helena, improving state highway WPMS 52, Unit 2, and WPMH 271-B, to C. Shannon, Butte, $37,578 and $27,838 respectively, est. $36,651 and $26,-621 respectively***WPHM 77-B, Unit 3, to Nolan Bros., Inc., 18 North 2nd St., Minneapolis, Minn., $17,900 est. $16,427***FAP 950-C, Unit 2, WPSO 352, to Barnard Curtiss Co., 808 Phoenix Bldg., Minneapolis, Minn., $210,-152 and $41,687 respectively, est. $234,706 and $42,342 respectively***WPGM 134-B, to Massman Constr. Co., New York Life Bldg., Kansas City, Mo., $73,987 est. $75,000*** WPMH 22-B and 222-E, and WPSO 370-U-1a and 2, to Standard Constr. Co., Bozeman, $142,-

Constr. News page 87

†Federal Government.

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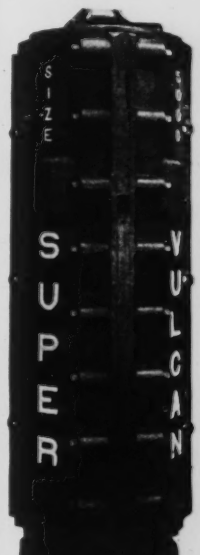

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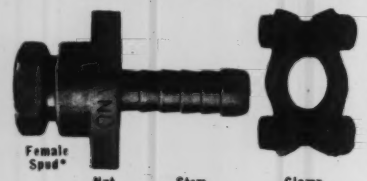

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Any trench from 16 in. to 42 in. wide up to 12 ft. 6 in. deep. Digging speeds range from 6 in. to 135 in. per minute.
THE BUCKEYE TRACTION DITCHER CO
FINDLAY, OHIO

Streets and Roads (Continued)

134 and $31,303 respectively, est. $131,267 and $28,950 respectively***FAP 245-G and 265-B, Units 1 and 2, to Albert Lalonde Co., Sidney, $77,417 est. $83,004***WPSO 346, to Cory & Bell, Inc., Red Lodge, $36,456 est. $33,658*** WPSO 349, to E. N. Brown, Bozeman, $34,566 est. $31,696***WPSO 350, to Collison & Dolven, Inc., Billings, $43,807 est. $40,428*** WPSO 366, to Nilson-Smith Constr. Co., Great Falls, $45,914 est. $42,766***WPGM 376, to Wachter O'Neil Constr. Co., Bismarck, N. D., $88,461 est. $92,310. Grand total $909,200. Bids Jan. 24. Noted Jan. 17, C. D.

★ **New Mexico**—State Hy. Comn., Santa Fe, top course surfacing and oil processing and rock asphalt seal coat on 15.127 mi. Eddy Co., to Capitol Constr. Co., Santa Fe, and Dudley Stone Products Co., 2101 San Diego St., El Paso, Tex., $146,519 est. $146,195*** grading, drainage structures, 3 culverts, steel, concrete bridge 6.69 mi. Otero Co., to G. W. Orr, El Paso, Tex., $159,553 est. $202,234 ***grading, drainage structures, culverts, bridge in Guadalupe Co., to W. E. Bondurant, Roswell, $51,880 est. $48,651***grading, minor structures, 2 culverts and bridge in Lea Co., to Armstrong & Armstrong, Roswell, $104,668 est. $101,492***9.868 mi. Otero Co., to New Mexico Constr. Co., Albuquerque, $177,246 est. $176,407. Grand total $639,866. Noted Jan. 16, C. D.

New York—See "Bridges and Grade Crossings."

N. Y., Falconer—Chautauqua Co., Mayville, improving State Line-Clymer Rd. $5,000; Ivory Rd. $17,000; Villenova-Forestville Rd. $60,000; Spencer Rd. $13,000; Pettit Corners-Charlotte Center Rd. $27,000; Charlotte Center-Cassadaga Rd. $71,000; Poland Center-Clark's Corners Rd. $57,000; Marvin French Creek Rd. $60,000, day labor and county forces. Grand total $310,000. S. E. Finch, co. supt. hys.

N. Y., Hamburg—Village, guttering and improving Lockesly Park, Orchard and Highland Acres, Hecker, Schultz, Killerman, Quimby, Mill Strip, Parker and Bay View Rds., Sprague, Lake View, Highland, Linwood and Rosedale Aves., relief forces. H. F. Burd, 1014 City Hall, Buffalo, Procurement Officer P.W.A. will purchase materials.

N. Y., Malone — City, surfacing, guttering Whittelsey and Terrace Sts., and bituminous topping Waters, Elbow, William, Spruce and Cherry Sts., relief labor. $28,000. W.P.A. J. F. Leeds, procurement officer W.P.A., South Street School, Glens Falls, will purchase materials.

N. Y., Warsaw—Wyoming Co., maintenance and improving various county highways, $75,000; completing Blackhouse Rd., $12,000; and paving Sheldon Center, $9,000, own forces. $96,000.

Ohio—J. J. Jaster, Jr., Ohio Hy. Dir., Columbus, Proposal 1, grading, drainage structures, concrete paving and roadside improvements 1.995 mi. and Proposal 2, capping wings and placing new concrete surface on existing concrete beam bridge 0.005 mi. Sect. D, Eaton-Richmond Rd., State Hy. 249, Route 11, Washington Twp., Preble Co., to Hinton & Smalley, Celina, $69,319 est. $87,973***grading, drainage structures (except bridges), placing bank run gravel surfacing 8.307 mi. Scioto Co., to Miller & Orndoff, Waterford, $36,637 est. $36,648***grading, drainage structures, roadside improvements 2.94 mi. Fulton Co., to A. A. Buller, 324 West Main St., Deshler, $129,964 est. $132,064***grading, drainage structures, traffic bound material paving 0.397 mi. Logan Co., to W. P. Townsend, Eaton Rd., Greenville, $79,324 est. $80,369***grading, drainage structures, roadside improvement, widening and hot mixed paving 2.526 mi. Lucas Co., to S. E. Johnson Co., 218 Terminal Bldg., Toledo, $176,840 est. $179,244. Grand total $491,584. Noted Jan. 13, C. D.—Jan. 23, E. N.-R.

Oregon—State Hy. Comn., Portland, improving road in Deschutes Co., to M. L. O'Neil & Son, Eugene, $15,842***122nd Ave.-Troutdale Section, Portland, to Jacobsen-Jensen Co., 517 Northeast Stanton St., Portland, $66,589*** overcrossing Multnomah Co., to Edlefsen-Weygandt Co., North Peninsular St. and Col. Blvd., Portland, $77,891***rock production project, in Union and Wallowa Counties, to A. A. Hardesty, Portland, $22,731. Grand total $183,053. Bids Jan. 9 and 10. Noted Jan. 16, C. D.—Jan. 2, E. N.-R.

Pa., Portage—City, oil and chips on 8 in. stone base surfacing various streets, relief labor. P.W.A. project approved. $60,000. **Maturity at once.** F. Hogan, Portage, engr.

Pa., Red Lion—City, grading, guttering, bituminous material paving various streets, day labor under supervision of Borough Engineer. $25,256. W.P.A. project approved.

Rhode Island — State Division of Contracts, Standards & Purchases, State Purchasing Agent, State House, Providence, bituminous macadam paving 0.611 mi. Project 119, Contr. 3518, Warren, to P. Romano & Sons, 54 Water St., Warren, $25,068***Type "B" bituminous macadam paving 1.876 mi. Bulgarmarsh Rd., Project 127, Contr. 3519, Tiverton, to Callan Constr. Co., Bay View Ave., Bristol, $31,935***mixed in place Type "A" bituminous paving 0.596 mi. Meridon Rd., Project 95, Contr. 3516, Woonsocket, to R. A. Bergesson, 442 Providence St., Woonsocket, $24,258. Grand total $81,261. Bids Jan. 6, awarded Jan. 27. Noted Jan. 13, C. D.

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Tex., Fort Worth — City, G. D. Fairtrace, mgr., brick on rein.-con. paving Rosedale St. between Renner Ave. and Macey St., to West Texas Constr. Co., 501 East Rosedale St., $20,811. Est. $245,000. P.W.A. Noted Nov. 22, C. D.—Oct. 31, E. N.-R.

Tex., Houston—Harris Co., grading, drainage structures, single bituminous surface treating 6.289 mi. Cedar Bayou-Lynchburg Cutoff Rd., and 7.977 mi. Crosby-Cedar Bayou and Barbers Hill Rd., to Brown & Root, Inc., 4,000 Calhoun Rd., $91,405 and $74,014 respectively ***grading, drainage structures, widening shoulders 4.148 mi. East Montgomery Rd., to Holden & Austin, 1st National Bank Bldg., $42,418*** grading, drainage structures, rein.-con. paving 1.352 mi. Tomball-Waller Rd., to Froemming Bros., 3901 Miramar St., Dallas, $49,843. Grand total $257,680. Awards subject to P.W.A. approval.

Utah, Ogden — City, graveling city streets, $19,000; and lowering sidewalk grades, $20,000, day labor. W.P.A. C. Coray, city engr.

Washington—L. V. Murrow, dir. Hys., Olympia, grading, crushed stone surfacing 1.003 mi. Farmer North, Douglas Co., to Goodfellow Bros., Inc., Wenatchee, $8,188***grading, crushed stone surfacing 1.733 mi. Suquamish Miller Bay Rd., Suquamish North, Kitsap Co., to J. S. Pederson & Son, Enumclaw, $17,468*** bituminous surfacing 4.027 mi. Sect. 1 and 10.343 mi. Sect. 2 Wenatchee City Streets, Chelan Co., to **Washington Asphalt Co.**, 220 West Hudson St., **Seattle**, $37,103***grading, surfacing, concrete steel overcrossing 0.449 mi. Hardesty Rd. overcrossing at Parkwater, Spokane Co., to D. Nygren & G. Schuehle, 309 Lloyd Bldg., Seattle, $125,512. Grand total, $188,271. Noted Jan. 9, C.D.

Ont., Kitchener—City, asphalt paving 1,000 ft. Belmont St., 80 ft., to Standard Paving Ltd., 402 Harbour Com. Bldg., Toronto. Est. $56,000. S. Shupe, city engr.

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

★ **Calif., Los Angeles**—C. H. Howell, engr., Flood Control Dist., 205 South Broadway, preparing an application to be forwarded to Washington for P.W.A. funds to finance construction of San Gabriel Dam 1 Spillway. Excavation will be done by the general contractors for San Gabriel Dam No. 1 (West Slope Construction Co.). Plans for the structure are being prepared under the supervision of P. Baummann, Junior assistant ch. engr. in charge of dams. Flood Control Dist. upon approval bids will be taken by the Bd. Supervs. Est. $1,000,000.

†**Calif., San Francisco**—U. S. Eng., making plans fill on Yerba Buena Shoals, for San Francisco Bay Exposition in 1938, incl. 16,000 lin.ft. rubble wall, revetments and 20,000,000 cu.yd. fill. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Ill., Chicago—See "Bridges and Grade Crossings".

★ **Mich., Detroit**—Wayne Co. plans approved reconstructing, straightening and deepening 468 mi. drains. $503,150. WPA project. L. J. Nowicki, Barlum Tower, county drain comr.

†**N. Y., New York**—U. S. Eng. plans dredging to remove isolated shoals in East River. $25,000.

O., Wapakoneta—City plans improving Auglaize River channel through city by straightening channel, erecting levee and concrete retaining wall. $80,000. W. P. A. project.

†**Tex., Brownsville**—Bureau of Aeronautics, Wash., D. C., plans extending water drains at air field. $20,848.

★ **Washington and Idaho**—Washington Water Power Co., 825 Trent Ave., Spokane, Wash., plans constructing and reinsulating 100 mi. transmission lines, constructing sub-station at Colfax and Pullman, Wash., and completing sub-station at Moscow, Idaho. $1,100,000.

BIDS ASKED

†**Illinois**—Feb. 13, by U. S. Eng., U. S. Court House and Custom House, St. Louis, Mo., 600,000 cu.yd. earthwork for rebuilding and enlarging levees of Lost Creek Drainage and Levee Dist. and Sub-district 1 of Hager Slough Special Drainage Dist., Cass Co.

†**Louisiana**—Feb. 19, by U. S. Eng., Prytania and River Front, New Orleans, dredging 420,000 cu.yd. in Lake Mongoulis Channel extension in Atchafalaya Basin, below Splice Island.

Mo., Cape Girardeau—Feb. 17, by Little River Drainage Dist., cleaning out ditch, incl. 60,903 cu.yd. excava. E. R. Schults, engr.

N. Y., Mamaroneck—See "Contracts Awarded."

N. Y., Utica—See "Contracts Awarded."

†**South Carolina**—See "Contracts Awarded."

†**Tex., Galveston**—Feb. 19, by U. S. Eng., repairing east jetty at Sabine Pass.

†**Tex., Galveston**—Feb. 21, by U. S. Eng., Galveston, constructing groins along seawall. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Earthwork, etc. (Continued)

†Tex., **Port Bolivar**—Feb. 14, by U. S. Eng., Galveston, dredging, portion of turning basin channel to Port Arthur, and deepening to 24 ft. at low tide, incl. 125,000 cu.yd. dredging.

†**Washington** — Feb. 24, by Bureau Reclamation, Yakima, constructing spillway at Kachess Dam, Yakima Project, 2.5 mi. northwest of **Easton**, Incl. 61,200 cu.yd. earthwork excav. for structure 660 cu.yd. excav. for concrete and rubble paving, 2,800 cu.yd. backfill, 11,000 cu.yd. earth fill embankment. Spec. 669.

Wash., Mount Vernon—Feb. 20, by Attorney, Verne Branigin, 205 Polson Bldg., constructing drainage canal with dam and tide gates of new outfall between Sullivan and Swinomish sloughs north of La Conner, with bridges and dikes, for D.D. 15, Skagit Co. L. Wright, Court House, engr. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

B. C., **New Westminster**—Feb. 12, by Secretary Dpt. P. Wks., Ottawa, Ont., constructing pile and timber protection wall on dredged mound at mouth of North Arm of Fraser River, involving 15,500 lin.ft. piling in place, 56,500 ft. B.M. lumber, planking and braces, incl. fastenings. $31,000. K. M. Cameron, Ottawa, Ont., engr.

B. C., **North Arm**—Feb. 11, by Secretary Dpt. P. Wks., Ottawa, Ont., dredging Fraser River. Est. about $200,000. K. M. Cameron, Ottawa, Ont., engr.

CONTRACTS AWARDED

†**Arkansas**—U. S. Eng., Vicksburg, Miss., constructing concrete sheet pile levee wall at Pine Bluff, to Fred Luttjohann, Topeka, Kan., $21,104. Bids Dec. 11. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

Calif., Westley — Directors West Stanislaus Irrigation Dist., concrete lining 2,000,000 sq.ft. in laterals in district under Contracts 1046-A, 653,700 sq.ft., laterals 4, 5 and 6 North, Contr. 1046-B, 666,600 sq.ft. Laterals 6 and 5, South; Contr. 1046-C, 681,000 sq.ft. Laterals 4 and 3 South and 3 North, to C. Wood, P. O. Box 49, and M. J. Bevanda, Elks Bldg., Stockton, $180,027. Est. $220,000. Bids Nov. 30, awarded Jan. 27. Noted Dec. 9, C. D.

★ †**N. M., Fort Sumner**—Bureau Reclamation, Dpt. Interior, Carlsbad, 1,550 ft. Alamogordo Dam, 135 ft. high, earth and rock fill, Carlsbad Project, to Hallett Constr. Co., Crosby, Minn., $1,132,547. Bids Dec. 14. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

N. Y., **Mamaroneck**—Municipality constructing seawall, along harbor from Barry Ave. to Shore Acres Yacht Club, day labor. $105,000. Owner will purchase materials.

N. Y., **Utica**—City, placing rip rap along banks of Starch Factory Creek for flood control, own forces. $30,000. W.P.A. D. Mahoney, Hotel St., Utica, Procurement Officer W.P.A.

†**North and South Carolina**—U. S. Eng., Custom House, Charleston, maintenance dredging between Cape Fear, N. C., and Winyah Bay, S. C., by own plant and W.P.A. labor. $20,000. Maturity Feb. 1.

†**South Carolina**—U. S. Eng., Custom House, Charleston, clearing out obstructions and snags as far as old lock and dam near Columbia on Santee and Congaree Rivers, by own plant and W.P.A. labor. $25,000. **Maturity about Jan. 27.**

†**Tex., Freeport**—U. S. Eng., Galveston, repairing Southwest Jetty consisting of preparing beds and placing thereon a concrete cap of 4,600 cu.yd., tentatively awarded to Texas Gulf Constr. Co., 2215½ C St., Galveston, at $13.64 per cu.yd., total $62,744. Bids Jan. 22. Noted Jan. 9, C. D.

Que., Sorel—Federal Govt., Dpt. P. Wks., Ottawa, Ont., dredging at St. Lawrence River, to Dredging Contractors Ltd., Montreal, $39,440.

UNCLASSIFIED

PROPOSED WORK

Arkansas — ELECTRIC POWER DISTRIBUTION and TRANSMISSION — Southwestern Telephone & Power Co., West Memphis, Tenn., plans electric power distribution and transmission line from Harrel to Banks. $37,000 or more.

California—OIL and GAS DEVELOPMENT—Corporation, c/o F. A. Sansome, 522 5th Ave., New York, plans oil and gas development, Huntington Beach oil field, Orange Co. $40,000 or more.

California—OIL and GAS DEVELOPMENT—L. D. Greenfield Co., 521 5th Ave., New York, plans oil and gas development in Playa de Ray oil fields. To exceed $40,000.

Calif., Concord—GAS MAINS—L. Olson, Clayton, of committee appointed by citizens to investigate proposal to install gas mains and furnish gas for residents of Clayton and Concord. To exceed $100,000.

Calif., Susanville—SWIMMING POOL—City, H. S. Riddell, engr., preparing plans concrete municipal swimming pool. $30,000.

Ind., Elwood — MAUSOLEUM, etc. — Sunset Memorial Park Co. plans mausoleum and burial ground, 1 mi. south of city. Est. about $30,000.

Ind., South Bend—AIRPORT—Municipal Bd. Aviation, W. Freyermuth, secy., City Hall, plans new airport, hangars, concrete runways, lighting system. W.P.A. project. Site purchased.

Kansas—OIL and GAS DEVELOPMENT—Corporation, c/o F. B. Hamlin, 580 5th Ave., New York, plans oil and gas development Russell Co. To exceed $40,000.

Mich., East Lansing—STADIUM—Michigan State College plans 2 story, 30,000 person seating capacity wood, rein.-con. stadium addition, plain found. $117,000. Private plans to be carried out by J. A. Hannah, secy. of State Bd. of Agriculture, as W.P.A. project.

Minn., Mahnomen—YARDS and STORAGE—Wilcox Lumber Co. plans constructing yards and storage. Est. about $37,000 with equipment. Architect not appointed. **Maturity indefinite.**

Mo., Maplewood (St. Louis, P. O.)—SWIMMING POOL—City, J. Feis, mayor, voted $35,700 bonds for constructing rein.-con. swimming pool and bathhouse. $37,000. B. Hutchinson, city engr. Noted Jan. 8, C. D.—Jan. 16, E. N.-R.

Nebraska and Kansas — GAS SERVICE — Nebraska Gas Fuel Co., Lexington, Neb., plans constructing natural gas pipe line from Hugoton, Kan., connecting with Ogallala, North Platte, Brady, Maxwell, Lexington, Gothenburg, Cozad, Overton, Elm Creek, Red Cloud, Blue Hill and Lawrence, all in Nebraska.

★ **Neb., North Platte** — TRANSMISSION LINES—Platte Valley Public Power & Irrigation Dist., North Platte, plans transmission lines to Lincoln, Neb., and irrigation works in Hall and Buffalo Counties. $4,000,000. Will apply for P.W.A. funds. D. D. Price, ch. engr.

★ **Neb., St. Paul**—RURAL ELECTRIFICATION—Howard County Rural Power Dist., St. Paul, plans constructing 600 mi. electric lines. $675,065. Henningson Eng. Co., 326 Union State Bank Bldg., Omaha, engrs.

★ **New Jersey**—ELECTRIC POWER SYSTEM —Public Service Electric & Gas Co., 80 Park Pl., Newark, plans reconstructing distribution system and placing same underground. $2,000,000. Private plans.

N. J., Jersey City—WHARF—City, Dpt. Parks & P. Property, City Hall, plans repairing wharf at foot Howell St., consisting of replacing split and broken piling, fenders, bracing, etc., bracing entire structure with additional piling, and timber and backfilling area, 150x300 ft. in rear of dock. $33,690. H. Clark, City Hall, engr.

N. Y., Brooklyn—WADING POOL, etc.—Dpt. Parks, Central Park, Arsenal Bldg., New York, plans by A. Embury, 2nd, c/o owner, plans wading pool and recreation building, 477 Jamaica Ave. $65,000.

N. Y., Cortland—AIRPORT—Bd. Supervs. Westchester Co., Court House, White Plains, plans constructing airport, on Park Department land. To exceed $23,000. W.P.A. project.

★ **N. Y., Buffalo**—SPORTS ARENA—Buffalo Amateur Hockey Assn., 109 Elmer Ave., plans constructing sports and skating rink, $500,000. H. E. Plumber & Associates, 755 Main St., engrs.

N. Y., Endicott—AIRPORT, etc.—City of Binghamton, Villages of Endicott and Johnson City, plan airport, incl. grading, runways, dikes along north bank of Susquehanna River, installing lighting facilities. $118,000. Applied for W.P.A. funds.

N. Y., Liberty—SWIMMING POOL—Corporation, c/o S. Bernstein, 7602 20th Ave., Brooklyn, making plans rein.-con. swimming pool, C. M. Pickney, Municipal Bldg., engr.

N. Y., New York—TUNNEL—S. Levy, pres. Manhattan Boro, Municipal Bldg., preliminary plans constructing 600 ft. highway tunnel, 2 traffic lanes, 30 ft. arch to continue 5th Ave. under Mount Morris Ave. To exceed $23,000. C. M. Pickney, Municipal Bldg., engr.

★ **N. Y., Stapleton**—PORT DEVELOPMENT—City of New York, F. LaGuardia, mayor, Municipal Bldg., New York, soon takes bids constructing free port, incl. 7 story warehouse, barriers, processing building, dredging, etc., at **Piers 12 to 16, $4,600,000.**

N D., New Rockford—SWIMMING POOL, etc.—City, F. S. Dunham, aud., plans constructing swimming pool and bathhouse. $27,000. P.W.A. project.

O., Toledo—DAM—City does not plan construction of dam across Naumee River near Wabash R.R. docks on west side and Oregon Rd. on east side to provide power up river mooring basin, water supply reservoir and provide two way lane highway to replace Fassett St. Bridge. C. E. Hatch, engr.-secy. City Planning Comn., and Lucas County Planning Comn. did recommend the County construction of a dam considerable number of miles further up the river, however, maturity of this proposition is very indefinite. (Correction—report Incorrect.) Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Okla., Oklahoma City—OIL DEVELOPMENT—Corporation, c/o T. G. Wylie & Co., 535 5th Ave., New York, plans oil and gas development from Oklahoma City oil field to factory. To exceed $40,000.

Okla., Oklahoma City—PIPE LINE—Devon Oil Co., Braniff Bldg., made preliminary plans 12,700 ft. 6 in. oil pipe line from 4th and Laird to 23rd and Kelly Sts. $40,000.

Federal Government.

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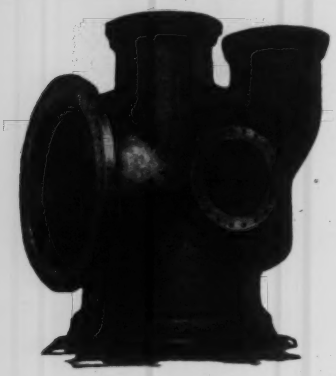

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Unclassified (Continued)

Okla., Oklahoma City—PIPE LINE—Empire Pipe Line Co., Bartlesville, made plans 4 mi. 6 in. oil pipe line in north of here. $40,000.

Okla., Oklahoma City—PIPE LINE—Superior Oil Co., Houston, Tex., made plans constructing 9,000 ft. 6 in. oil line on Laird Ave. $28,000. E. D. Hill, Industrial Bldg., engr.

Okla., Oklahoma City — PRESSURE GAS LINES—Phillips Petroleum Co., Bartlesville, made preliminary plans constructing 10,200 ft. 10 in. steel pipe for pressure gas line on Rhode Island St. $40,000.

Pa., Dunmore—FIRE ALARM SYSTEM—Boro plans extension of fire alarm system to include installation 10 or 15 new call boxes, purchase 5 sirens, 3,000 ft. fire hose, also additional hydrants at various locations and general improvement of fire protection service in Sport Hill and Dundell Sections. To exceed $17,750. F. Murphy, Chief, Fire Dept., Boro Hall.

Pa., Erie — AIRPORT — City, A. N. Aitkin, city engr., plans developing modern municipal airport at West Lake Rd. and Asbury Chapel Rd., incl. administration building, hangars, grading and paving runways, floodlighting system, etc. Est. $392,000. Noted Dec. 12, C. D. —Dec. 19, E. N.-R., under "Kearsarge."

Pa., Oil City—ATHLETIC FIELD, etc.—City plans new project to complete municipal athletic field and stadium in Hasson Heights, incl. installtion of drainage necessary, constructing new street, completion of bath house, installation of electrical equipment, etc. Est. $200,000. Project about 45% completed under former relief setups. About $25,000 to be expended for materials. B. B. Weber, city engr. Noted Feb. 1, 1935, C. D.—Sept. 7, 1935, E. N.-R.

★ **Pa., Phila.**—SUBWAY COMPLETION—City, G. Exley, dir., City Hall, plans completed for completion of South Broad St. subway from Kater St. to Snyder Ave., completion of Locust St. subway from 8th and Ranstead to 18th and Locust Sts.; completion of City Hall Concourse, also various repaving in connection with this work. $5,500,000. Pending sale of bond issue soon. Noted Apr. 13, 1934, C. D.—Apr. 19, 1934, E. N.-R.

★ **Pa., Scranton**—MINE FLUSHING PROGRAM—City, City Hall, C. F. Schroeder, engr., plans flushing operations in 8 areas in city to cover coal veins now dormant to protect city property. $20,000,000. Engineer completing final preliminary plans and city may submit project to Federal Authorities to aid in financing. **Maturity indefinite.** G. H. Wilson, city mine cave engr.

Pa., Wilkes-Barre — AIRPORT IMPROVEMENT—City, Wilkes-Barre Airport, G. Eckman, mgr., plans general improvement of municipal airport over next 10 month period. $199,271. W.P.A. project approved. Will seek approval of Federal Dpt. of Commerce. **Maturity early in spring.** W. P. Johns, city engr.

S. D., Watertown—AIRPORT—City, M. Hopkins, aud., plans constructing municipal airport. $30,000. W.P.A. project. R. Reed, city engr.

Texas—OIL DEVELOPMENTS—Alger Oil Co., Shreveport, La., plans additional development of oil properties on 82 acre tract, East Texas oil fields. To exceed $100,000.

Tex., Brownsville — AIRPORT IMPROVEMENTS—City, under supervision of U. S. Govt. Bureau of Aernautics, Dpt. Commerce, Wash., D. C., plans gravel runways and making dirt extensions to present runways. $30,000. Bureau of Aernautics approved plans.

Tex., San Benito—AIRPORT—City, c/o P. Smith, mgr., preliminary plans, etc., airport, incl. runways, hangars, repair shop, lighting system for night, surfacing, etc. $100,000. P.W.A. project. Noted June 22, 1934, C. D.—June 28, 1934, E. N.-R.

Tex., Sweetwater — AIRPORT IMPROVEMENTS—City plans improvements to airport, consisting of runways, earth and gravel topping, beacon lights, some drainage. $45,700. Bureau of Aeronautics, Dpt. Commerce, Wash., D. C., approved plans.

Tex., Taft—NATURAL GAS PIPE LINE—City does not plan to construct 8 in. steel main pipe line for running gas to city limits, ready for distributing system within city limits. $40,000. P.W.A. loan rescinded. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, engrs. Project may be revived later on City's own resources. Noted Aug. 30, C. D.—Sept. 5, E. N.-R.

Wash., Seattle—GOLF COURSE—Dpt. Parks plans golf course, West Seattle. $250,000. W. C. Hall, Jr., 4059 39th St. S.W., engr. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

Wash., Tacoma—HIGH TENSION INTERTIE LINES, etc.—Light Dpt., City Hall, plans constructing high tension inter-tie lines and rebuilding equipment at Nisqually sub-station. $115,000. C. D. Forsbeck, City Hall, Engr.

Wash., Vancouver — DOCK — Port of Vancouver plans constructing 191x810 ft. dock with 120x740 ft. warehouse, extension of turning basin. $303,000. J. S. Metcalf & Co., Vancouver, engrs. P.W.A. funds allotted.

W. Va., Bluefield—COAL TIPPLE, etc.—Oakwood Smokeless Coal Co. plans coal tipple, coal handling and mining development on Garden Creek and Levisa River. To exceed $50,000.

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B. C., Vancouver—POWER DEVELOPMENT—Pacific Power & Water Co. Ltd., plans power development in spring. $200,000.

Man., Winnipeg—SUBWAY—City soon takes bids constructing subway to eliminate level crossings on Portage Ave., 76 ft. pavement, 8 ft. sidewalks and earth rock retaining walls. $207,000. W.P. Bremerton, Winnipeg, engr.

Que., Carleton — TRANSMISSION LINE — Carleton Electric Co., Three Rivers, plans constructing 20 mi. transmission line in spring.

★ **Que., Montreal** — SUBWAY — Municipality preparing plans constructing subway under Lachine Canal at Cote St. Paul. $1,500,000.

BIDS ASKED

Calif., Los Angeles—RAILWAY—Feb. 19, by Los Angeles Harbor Dpt., City Hall, constructing standard gage railroad track, incl. grading, track laying, trestle construction, paving automatic grade crossing protection, etc. Harbor Spec. 946, P.W.A. Docket 1208, Unit 1, $119,247; constructing railroad interlocking plant at East Thenard and West Thenard Sts., Wilmington to control movements of trains over 6 crossings, incl. construction of concrete tower building for housing local and remote control of switches, signals, etc., frame tool house, setting concrete, 1 electric interlocking machine, 34 actual and 6 reserve functions, 12 searchlight type signals (home), 2 same (distance), 2 dwarf signals, 8 distance warning signs, not interlocked, 4 telephone stations, 12 interlocked derailing switches complete, 1 electric switch lock and derail, 55 35 ft. butt treated and painted, Western Red cedar poles, etc., Spec. 947, $44,889. A. Eldridge, City Hall, genl. mgr.

Calif., Los Angeles—WHARVES, etc.—Feb. 19, by A. Eldridge, city mgr., City Hall, constructing creosoted timber wharf and fender system, 599 ft. long, 39 ft. wide, incl. connections to existing wharf at Berth 146 Los Angeles Harbor, removal of 12 pile dolphin and cat walk, constructing timber approaches, asphaltic concrete roadway, electrical installation and water services, fencing and gates and 8 standard gage railroad service tracks, P.W.A. Docket 1206, Spec. 954, $190,316; reconstruction, relocation of transit shed, Berth 155, incl. relocation of shed sprinkler tank and buildings, constructing concrete retaining walls, make and settle earth fill to new floor level, concrete floor and integral column footings, concrete pavement, curbs and loading platforms, relocate all electric, water and gas lines and relocate two existing railroad tracks, P.W.A. Docket 1210, Spec. 948, $45,000; creosoting timber apron wharf, 462x 22.5 ft., fender system, framing timber wharf structure, furnishing, placing crane rails and fastenings, etc., P.W.A. Docket 1409-1, Spec. 949, to exceed $23,000; constructing concrete wharf and steel frame transit shed at Berth 155, involving concrete wharf deck, steel frame transit shed, 144 ft. long x 120 ft. wide, steel rolling doors, sprinkler systems, electric system, boat line piping under concrete and timber apron, concrete retaining walls, earth fill for transit shed floors, timber, pipe and concrete foundations and structures for baggage conveyor, etc., P.W.A. Docket 1209-2, Spec. 950, $61,000.

Mass., Beverly—STADIUM—See "Contracts Awarded."

Mass., Boston — AIRPORT — See "Contracts Awarded."

Mo., St. Louis—WALKS, etc.—Mar. 3, by Bd. P. Serv., City Hall, reconstructing walks, steps, retaining wall around Government Hill Pavilion, Forest Park. P.W.A. project. W. C. E. Becker, city engr.

Mo., St. Louis—ZOO—Feb. 21, by Zoological Bd. Control, G. P. Vierheller, secy., Primate House, Forest Park, St. Louis, constructing Houses 1-A and 1-B, for camels, 2-A and 2-B for goats and 3-A and 3-B for other hoofed animals (barless cages) for zoo. P.W.A. project. J. W. Wallace, Primate House, Forest Park, St. Louis, archt.

N. J., Pitman—ATHLETIC FIELD—See "Contracts Awarded."

N. J., Secaucus—RECREATIONAL CENTER—See "Contracts Awarded."

N. J., Union City—FIRE ALARM SIGNAL SYSTEM, etc.—See "Contracts Awarded."

N. Y., Binghamton—AIRPORT—See "Contracts Awarded."

N. Y., Camden—GAS DISTRIBUTION SYSTEM—See "Contracts Awarded."

N. Y., Niagara Falls—AIRPORT—See "Contracts Awarded."

Pa., Genesee—GAS PIPE LINE—Godfrey L. Cabot, Inc., 1st Natl. Bank Bldg., Olean, N. Y., and 77 Franklin St., Boston, Mass., taking bids natural gas line from Potter County Field to supply industrial and commercial and domestic consumers with natural gas in and near here. To exceed $17,750. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Utah, Ogden—RUNNING TRACK—See "Contracts Awarded."

†**T. H., Pearl Harbor**—QUAY WALL—Yards & Docks, Navy Dpt., Wash., D. C., taking bids constructing extensions to quay wall, Spec 8014. (Date not set.)

CONTRACTS AWARDED

Fla., Jacksonville—RAILWAY—See "Materials and Equipment."

†*Federal Government.*

Unclassified (Continued)

Mass., Beverly—STADIUM—City, W.P.A. Administrator, City Hall, A. H. Richardson, City Hall, constructing stadium at Marshall Field, incl. wooden stands, ticket booths, field and locker houses, wire fence, etc., relief labor. Est. $25,000. **W.P.A.** Owner purchases materials.

★ **Mass., Boston — AIRPORT — City, W. P.** Long, chn. Park Dpt., 33 Beacon St., improving East Boston Airport, incl. grading, excavation, drainage system, lighting system, relocating floodlights and fences, concrete floors in some buildings, general building improvements, relief labor under supervision of W.P.A. Total est. $2,500,000. W.P.A. grant $453,984. Boston Works Project Bd., 40 Central St., engrs.

Mo., Fulton—GAS DISTRIBUTION SYSTEM—City, natural gas distribution system with accessories, to C. E. Tinney Eng. Co., Minneapolis, Minn., $47,767. Est. $50,000. **Maturity in February.** Bids Jan. 26. Noted Dec. 6, C. D.—Dec. 12, E. N.-R.

N. J., Pitman—ATHLETIC FIELD—Borough, constructing athletic field and grandstand, relief labor. $24,961. R. G. Haaf, Broadway and Royden St., Camden, **W.P.A.** engr.

N. J., Secaucus—RECREATIONAL CENTER—Town, Town Hall, constructing recreation center in rear of Lincoln School, consisting of stadium, grandstand and baseball field, relief labor. $117,435. **W.P.A.** F. W. Brannagan, 243 Washington St., Jersey City, **W.P.A.** engr.

N. J., Union City—FIRE ALARM SIGNAL SYSTEM, etc.—City, City Hall, reconstructing police and fire alarm signal system between 12th to 24th Sts., also between Palisades Ave. and Hudson Blvd., relief labor, $28,939; replacing broken cables for police and fire alarm signals from 24th to 36th Sts., $25,365. **W.P.A.** F. W. Brannagan, 243 Washington St., Jersey City, **W.P.A.** engr.

N. J., Westfield—ATHLETIC FIELD—Bd. Educ., Roosevelt School, constructing fireproof public school athletic field house and stadium to G. T. Kelly, 2 Hudson St., Yonkers, N. Y., $25,449***plumbing, to A. Arace, 842 3rd Ave., Elizabeth, $4,262***heating and ventilating, to J. H. Neller, 835 Springfield Ave., Irvington, $1,918***electrical work, to A. Neri, 928 Washington St., Hoboken, $880. Grand total, $32,509. **P.W.A.** Noted Jan. 28, C. D.—Jan. 30, E. N-R

N. Y., Binghamton — AIRPORT — Cities of Johnson City, Endicott and Binghamton, constructing airport, relief labor. $119,000. **W.P.A.** A. Calabriso, Telephone Bldg., will purchase materials.

N. Y., Buffalo—UNLOADING PLATFORM—See "Industrial Buildings."

N. Y., Camden—GAS DISTRIBUTION SYSTEM—Corporation, c/o N. R. Kneass, 551 5th Ave., New York, installing natural gas distribution system to serve domestic and commercial uses, incl. pipe line and distribution lines, separate contracts. $25,000 or more. Noted Oct. 19, 1934, C. D.—Oct. 25, 1934, E. N.-R.

New York—TUNNEL, etc.—Port of New York Authority, 111 8th Ave., New York, constructing New York river ventilation building for Midtown Hudson Tunnel, to Cauldwell Wingate Co., 101 Park Ave., New York, $347,350; 64 land borings to determine the subsurface conditions along the approach line in North Bergen, N. J., to Standard Drilling Co., 4515 Avenue N, Brooklyn, $7,588. **P.W.A.** Bids Jan. 30. Noted Jan. 31, C. D.—Jan. 9, E. N.-R.

N. Y., Niagara Falls—AIRPORT—City, City Hall, constructing runways, hangar, grading, drainage for airport, day labor. $116,088. **W.P.A.**

N. Y., Syracuse—SIGNAL STATION—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing Signal Station 48, between Midler and Nichols Aves., in connection with grade crossing elimination, to W. M. Ballard Co., 108 West Fayette St. General contractor awarded contract for reinforcing steel, to Brewster & Williams, Inc., Dillaye Bldg., Syracuse; fabrication, to Concrete Steel Co., 207 James St. Noted Dec. 2, C. D.—Oct. 10, E. N.-R.

O., Lima — STADIUM — Bd. Educ., general contract plumbing, heating and electric for stadium, to Green & Sawyer, Lima, $62,170. **P.W.A.** Noted Dec. 11, C. D.

Utah, Ogden—RUNNING TRACK—City, constructing athletic field running track, day labor, $23,500. **W.P.A.** C. Conray, city engr.

Que., Sept Iles—WHARF—Dpt. P. Wks., constructing wharf, to Cie de Constr. de La Cote Nord, Quebec City, $56,597.

MATERIALS AND EQUIPMENT

PROPOSED WORK

MOTOR GRADER, etc.—**Colton, Calif.**—City Clerk rejected bids Jan. 16, furnishing one power-controlled pneumatic tired motor grader, cab front, equipped with scarifier, 10 ft. moldboard and foot brakes. To exceed $1,000. L. E. Newcomer, City Hall, engr.

COPPER WATER TUBING—Glendale, Calif.—City Clerk, received no bids Jan. 23, furnishing annealed copper water tubing, as follows: 32,000 ft. ¾ in., 8,000 ft. 1 in., in coils and 1,500 ft. 1¼ in., and 2,000 ft. 2 in. in straight lengths. Noted Jan. 16, C. D.

†*Federal Government.*

†**COPPER STRIPS—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., cancelled bids to have been opened Jan. 23, copper strips. Proposal 385: $13,000.

†**GENERATOR—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., rejected bids Jan. 10, furnishing motor generators, Proposal 354.

CATERPILLAR TRACTOR — Santa Rosa, Calif.—Sonoma Co. authorized county purchasing agent to purchase caterpillar tractor.

COMPRESSOR—Bridgeport, Conn.—City, P. Wks. Dpt., P. Brewster, dir., plans purchasing compressor for use at sewage disposal plant. $1,000.

GRADING EQUIPMENT—Hartford, Conn.—City, G. W. Callahan, dir. of projects, C. A. A. Nott, engr., plans expending $22,000 for grading equipment, incl. loaders, graders, etc., for airport expansion, Brainard Field.

TANKS—Plainville, Conn.—E. L. Dubaine, Forestville, plans two 20,000 gal. oil tanks on oil terminal property recently purchased, South Washington St. Private plans.

FIRE ENGINE, etc.—**Nantucket, Mass.**—Town, O. V. Hull, chn. Bd. Selectmen, Town Hall, plans purchasing fire engine, auto truck and snow plough.

MOTOR GRADERS—Faribault, Minn.—A. W. Luecke, aud. Rice Co., takes bids in February, furnishing 1 or more motor graders. C. E. Stahl, co. hy. engr.

PAVING MACHINE—Minneapolis, Minn.—City, F. S. Gram, purch. agt., rejected bids Jan. 6, 1 paving machine for Engineering Dpt. Will readvertise. Noted Dec. 30, C. D.

SNOW PLOW—Worthington, Minn.—Nobles Co., C. Thom, aud., plans purchasing 1 motor operated snow plow of either blower type or heavy 4-wheel drive truck type. H. R. Bray, co. hy. engr.

STEEL TANKS—St. Louis, Mo.—G. J. Carson, 3202 Market St., granted permit to install two underground steel tanks for automobile filling station, 3203 Market St.

STEEL TANK— St. Louis, Mo.—T. E. Power Lumber Co., 24 Branch St., applied for permit to install one 1,000 gal. underground steel tank for gasoline, at 24 Branch St.

TUNNEL LINER PLATES—Albany, N. Y.—See "Waterworks."

STORAGE TANK — Binghamton, N. Y. — Kradjian Bros., 24 Charlotte St., will purchase steel gasoline tank for new service station at Main and Schiller Sts. To exceed $1,000. Crew Levick Co., 424 Court St., lessee.

TANKS — Brooklyn, N. Y. — Brighton Beach Garden Apartments, Inc., R. Brown, secy., 67 Liberty St., New York, plans purchasing fuel oil storage tanks for 6 story apartments, 1112 Brighton Beach Ave. To exceed $10,000. Interborough Eng. Corp., c/o owner, engrs.

STEEL STORAGE TANK—Buffalo, N. Y.—G. K. Hambleton, 300 Woodbridge Ave., will purchase steel storage tank for gasoline for new service station, 2933 Bailey Ave. To exceed $1,000.

STEEL TANK—Jamestown, N. Y.—Sterling Oil Co., of Pennsylvania, Emlenton, Pa., plans purchasing steel tank for service station, 504 West 3d St. H. C. Clepper, 741 North Negley Ave., Pittsburgh, Pa., engr.

STEEL TANKS—Jamestown, N. Y.—Swan-Hall Oil Co., J. Swanson, mgr., Buffalo and East 2nd Sts., plans purchasing 500 gal. steel tanks, electric pumps, etc., for installation at service station, in various locations in Chautauqua Co. To exceed $1,000. **Maturity in spring.**

FIRE FIGHTING EQUIPMENT — Mohawk, N. Y. — German Flatts, Columbia, Little Falls and Warren Twps., plans organizing central fire district and will purchase motor fire truck, pumping unit and booster tank, for Fire Dist. W. Smith, chn., Mohawk. To exceed $1,000.

TANKS, PUMPS, etc.—**New York, N. Y.**—Dochterman Realty Corp., 135 West 14th St., plans purchasing 500 and 1,000 gal. underground gasoline tanks, pumps, etc., for 1 story service garage at 57 East 10th St. J. Z. Cohen, c/o owner, archt. and engr.

STORAGE TANK—North Tonowanda, N. Y.—Erie County Savings Bank, Main St., plans purchasing steel tank for gasoline service station at Main and Tremont Sts. To exceed $1,000. Pure Oil Co., Ellicott Sq. Bldg., Buffalo, lessee.

PAPER MACHINERY—Syracuse, N. Y.—Syracuse University will purchase paper mill machinery for complete paper plant in State Forestry School. To exceed $50,000. Taking bids now on materials for foundations and platforms on which machinery is erected. Bids Jan. 29, structural and reinforcing steel, about $3,500.

†**PIPE—Wellsville, N. Y.**—G. H. Schrack, P. O. Box 625, Williamsport, Pa., plans purchasing 3,500-4,000 ft. 6¼ or 6¼ in. iron pipe; connections, etc., for delivery near here. $6,000.

MOTOR TRUCK—Westfield, N. Y.—Allen Contg. Co., F. Allen, mgr., 161 West Main St., plans purchasing heavy duty motor truck chassis equipped with winch. $2,500.

STEEL TANKS, etc.—**Westfield, N. Y.**—F. L. Allen, 161 West Main St., plans installing two 550 gal. steel tanks and electric pump for gasoline storage. To exceed $1,000.

FIRE FIGHTING EQUIPMENT—Erie, Pa.—City, Dpt. P. Safety, plans purchasing new hook

Constr. News page 91

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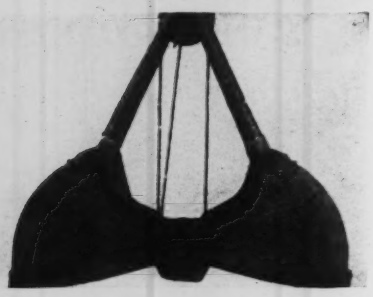

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Materials, etc. (Continued)

and ladder truck, $12,000; or modernizing equipment on present 22 year old unit, $6,000.

FIRE TRUCK—Kingston, Pa.—Boro, C. H. Blochberger, secy., plans purchasing new motor driven fire pumper truck with booster tank, etc. To exceed $1,000.

STEEL TANKS, etc. — Phila., Pa. — J. F. Geiger, Holland, plans installing several 500 gal. steel tanks, electric pump, air compressor, etc. at gasoline service station to be built at Front St. and Roosevelt Blvd. To exceed $1,000.

FIRE TRUCK—Pleasantville, Pa.—Village Bd. Trustees, Village Hall, plans purchasing of motor driven chemical fire truck. **Maturity at once.** To exceed $1,000.

FIRE TRUCK — Sugar Grove, Pa. — Grove Volunteer Fire Dpt., W. Abbey, in charge, plans purchasing 1½ ton motor fire truck, enclosed cab and pump and booster tank. Est. $4,000.

FIRE FIGHTING EQUIPMENT—Newport News, Va.—City soon takes bids fire fighting equipment, incl. 500 gal. pumper for **Station 3.**

FIRE TRUCK—Weirton, W. Va.—City Council plans purchasing fire truck to replace vehicle entirely destroyed by fire. $10,000.

LADDER TRUCK—Victoria, B. C.—Municipality soon takes bids for aerial ladder truck. $20,000 available.

TRACTORS, TOOLS, etc.—Victoria, B. C.—Provincial Dpt., Lands & Mines, plans purchasing replacements of forest fire fighting equipment, incl. tractors, tools, hose, etc. $75,000.

WATER METERS—Port Elgin, Ont.—Municipality, J. J. Chapman, clk., plans purchasing water meters.

ROAD MACHINERY—West Flamboro, Ont.—Township, Mrs. F. A. Gorman, clk., interested in prices of road machinery.

BIDS ASKED

RECONSTRUCTING RAILWAY TRACKS—**San Francisco, Calif.**—Feb. 19, by Public Utilities Comn., City Hall, reconstructing Geary St. tracks of municipal railway between Powell and Kearny Sts., involving 2,450 ft. girder rail track, complete, replace pavements. P.W.A. project. J. J. Casey, city engr.

†**FENCING MATERIAL, etc.—Wash., D. C.**—Feb. 14, by Purchasing Officer, Panama Canal, Wash., D. C., fencing material, wire rope, steel seizing strand wire, galvanized sheet iron or steel, steel bars and plates, brass, copper, copper-nickel alloy, sheet aluminum, plate zinc, sheet lead, brass and copper pipe, copper tubing, nais, brass valves, etc.

†**DRILLING MACHINES — Eastport, Me.** — Feb. 10, by U. S. Eng., blast hole drilling machines.

†**POWER SHOVEL, etc.—Eastport, Me.**—Feb. 10, by U. S. Eng., crawler mounted power shovel 2½ yd. capacity, Diesel or Diesel driven; 90 hp. Diesel crawler tractor with bulldozer, winch and tools.

†**TRUCKS, etc.—Eastport, Me.**—Feb. 11, by U. S. Eng., Eastport, 10 trucks with 4 cu.yd. rear dump type hydraulic dump body; 1 pile driver.

FIRE HOSE, etc.—Baltimore, Md.—Feb. 12, by Bd. Awards, H. W. Jackson, pres. Bd., Lexington and Gay Sts., furnishing, delivering fire hose and cable.

†**HOSE — Greenfield, Mass.** — Feb. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., 90,000 ft. 1 in. high pressure spray hose in 50 ft. lengths; 63,000 ft. various sized high pressure spray hose in 50 ft. lengths, f.o.b. here.

GRADER—Gaylord, Minn. –Feb. 11, by W. C. Oldenburg, aud. Sibley Co., 1 motor patrol grader with 14 ft. moldboard. A. Lehman, co. hy. engr.

†**CAST STEEL—Vicksburg, Miss.**—Feb. 12, by U. S. Eng., Vicksburg, cast steel 90 degree gudgeon elbow.

†**RIVETS—Vicksburg, Miss.**—Feb. 25, by U. S. Eng., 10,400 lb. structural steel button head rivets in kegs of 200 lb. each, f.o.b. Vicksburg.

†**LUMBER—Kansas City, Mo.**—Feb. 24, by U. S. Eng., 232 Mfg. Exch. Bldg., furnishing 288 Bd. ft. lumber, f.o.b. contractor's plans. $9,000.

†**STEEL PLATE, etc.—Fort Peck, Mont.**—Feb. 12, by U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, 510,000 lb. 18 gage steel plate as sheeting for Fort Peck Tunnels, $13,000; and 8,540,000 lb. ring beams and splice bars, 3,488,000 lb. purlins and clip angles, 586,000 lb. bolts, for Fort Peck Dam, $420,000.

TRANSFORMERS — Columbus, Neb. — Feb. 27 by Loup River Power Dist., C. B. Fricke, pres., furnishing power and station service transformers for Monroe Hydro-electric Power Station, near Monroe, Neb. and for Columbus Hydro-electric Power Station, near here.

†**CABLE, etc.—Brooklyn, N. Y.**—Feb. 24, by New York Signal Corps, Procurement Dist., Army Base, 58th St. and 1st Ave., 24,000 ft. cable and 24 reels for same.

†**CABLE, etc.—Brooklyn, N. Y.**—Mar. 2, by New York Signal Corps, Procurement Div., Army Base, 58th St. and 1st Ave., 7,040 ft. cable and 2 reels for same.

†**WIRE—Brooklyn, N. Y.**—Feb. 21, by Signal Corps, Procurement Dist., Army Base, 58th St. and 1st Ave., 560,000 ft. wire.

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BRICK—New York, N. Y.—Progressive Clay Co., 450 7th Ave., in market for supply of fire brick.

MOTOR TRUCKS—New York, N. Y.—[illegible] 11, by R. Forbes, comr. Purchase, Municipal Bldg., furnishing, delivering motor trucks for Dpt. Purchase.

FOUNDATION and PLATFORM MATERIALS—Syracuse, N. Y.—See "Proposed Work under Paper Machinery."

DIESEL ENGINE, etc.—Oklahoma City, [illegible] —City in market 1 40 hp. Diesel engine, crawler type tractor; 40 hp. motor on [illegible] bar pull. E. E. Scott, supt. transportation.

LUMBER, etc.—Fairview, Pa.—Feb. 10, by C. L. Weislogel, secy., c/o Joint High School Dist., furnishing rough and dressed lumber, hardware, concrete materials, slabs, brick, structural tile and brick tile, structural steel and steel accessories for use in construction of [illegible] school. To exceed $1,000. R. A. Freeman, 1105 West 3rd St., Jamestown, N. Y., engr.

†**SWITCHBOARDS — Knoxville, Tenn.** — Feb. 18, by Tennessee Valley Authority, Knoxville, furnishing, selling, delivering main control room switchboards, terminal boards, hydraulic [illegible] boards, annunciator boards, oscillograph [illegible] instrument transformers, for Norris Power Plant. C. H. Garity, dir. Purchases.

SLUDGE COLLECTOR EQUIPMENT—Maryville, Tenn.—Feb. 15, by Bd. City Comrs. at office of J. I. Walker, recdr., furnishing sludge collector equipment for sedimentation tanks. Dimensions of each of the 2 tanks are 40 ft. length, 11 ft. 5 in. width, 6 ft. water depth. A. R. McCammon, mayor, G. M. Bassel, engr.

CASTINGS, etc.—Milwaukee, Wis.—Feb. [illegible] by City, J. W. Nicholson, purch. agt., 59 tons special castings, 21 tons offset pipes, 2 tons tapping sleeves, valve boxes and parts, two hundred ninety 3- to 16-in. gate valves, 25 tapping valves, one 20 in. and three 24 in. gate valves, 200 fire hydrants.

CRANE—Nanaimo, B. C.—Feb. 25, by Secretary Dpt. P. Wks., Ottawa, constructing 6 ton traveling electrically operated crane for assembly wharf. $35,000. K. M. Cameron, Ottawa, engr.

PIPE—St. Mary's, Ont.—Municipality, W. MacKee, clk., in market for 600 ft. 6 in. cast pipe.

ELECTRIC MOTORS — Lachine, Que. — J. Longtin, 550 Notre Dame St., in market for 2 hp. and ½ hp. 110 volts electric motors.

CONTRACTS AWARDED

BRONZE FITTINGS—Los Angeles, Calif.—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South B'way., furnishing 500 each 2 in. bell and thread corporation cocks, 350 each 1 in. corporation cocks, copper tubing, couplings, 250 each 2 in. curb cocks, Spec. X-5, to James Jones Co., 201 Le Roy St., $2,855. Bids Jan. 13. C. D.

CABLE—Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Broadway, furnishing 106,000 ft. lead covered paper-insulated cable, Spec. 1861, to Okonite-Callender Cable Co., 2450 Hunter St., $9,109***; to General Cable Corp., 3600 Mines Ave., $14,288***to General Electric Co., 5201 Santa Fe Ave., $12,482***126,000 ft. 30% Hevea rubber-insulated, braid-covered solid copper wire, Spec. 1860, to Bishop Wire & Cable Co., c/o A. B. Vandercook, 2412 Ocean View Ave., $1,500. Grand total $37,379. Bids Jan. 17, awarded Jan. 23. Noted Jan. 27, C. D.

CONCRETE AGGREGATES — Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., concrete aggregates in such quantities as may be required within 6 months from date of contract, Spec. 1862, to Pacific Rock & Gravel Co., Rowan Bldg., $5,000. Bids Jan. 16, awarded Jan. 28.

COPPER WIRE—Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt Water & Power, 207 South Bway., furnishing 150,000 lb. medium hard drawn triple braid weatherproof insulated copper wire, Spec. 1865, to Anaconda Wire & Cable Co., 430 Coylton St., $24,855. Bids Jan. 20, awarded Jan. 23. Noted Jan. 28, C. D.—Jan. 22, E. N.-R.

LUMBER—Los Angeles, Calif.—A. J. Holm, city purch. agt., City Hall, furnishing miscellaneous Douglas fir and Redwood lumber, Spec. 3450, to Owens-Parks Lumber Co., 2100 East 38th St., $5,947; furnishing miscellaneous lumber and millwork, Spec. 3454, to A. J. Koll Planing Mill, 421 Colyton St., $3,687. Bids Jan. 14 and 17 respectively. Noted Jan. 9, C. D.

PICK-UP SWEEPERS—Los Angeles, Calif.—A. J. Holm, city purch. agt., City Hall, furnishing two each Austin Western motor pick-up sweepers or two each Elgin same, Spec. 3453, to Brown Bevis Equipment Co., 4900 Santa Fe Ave., $7,350. Bids Jan. 17, awarded Jan. 23. Noted Jan. 24, C. D.

COPPER TUBING—Oakland, Calif.—J. H. Kimball, secy. East Bay Municipal Utility Dist., 512 16th St., Oakland, 50,000 lin.ft. ¾ in. seamless copper tubing, Spec. LS-163, to Oakland Plumbing & Supply Co., 4th and Harrison Sts., $5,585. Bids Jan. 8, awarded Jan. 21.

ROAD OIL—Ontario, Calif.—City Clerk, 2,400 bbl. SC-2 road oil, delivered and spread in minimum quantities of 200 bbl., to Petrol Corp., 4020 Bandini Blvd., Los Angeles, $2,304. Est. $2,500. Bids Jan. 6, awarded Jan. 20.

†*Federal Government.*

Materials, etc. (Continued)

GATE VALVES—**San Francisco, Calif.**—City Purchasing Agent, furnishing gate valves for Water Dpt., Spec. 1468, to General Eng. & Drydock Co., 1100 Sansome St., San Francisco, $1,452.

TROLLEY WIRE—**San Francisco, Calif.**—T. A. Brooks, city purch. agt., City Hall, furnishing 5 mi. ¼ RD alloy trolley wire, Bid 1495, to General Cable Corp., 30 Otis St., $19.72 per cwt. Bids Dec. 16, awarded Jan. 14.

PORTLAND CEMENT, etc.—**Colorado**—Bd. Water Comrs., Denver, furnishing 24,200 bbl. cement, f.o.b. Devinny, to Rio Grande Fuel Co., 123 Santa Fe Drive, Denver, $69,938*** 10,500 bbl., f.o.b. Arvada, to F. J. Fisher, Denver, $30,765***800 bbl., to Colorado Portland Cement Co., Denver National Bank Bldg., Denver, $2,224. Grand total $102,837. All foregoing in connection with filter plant, Ralston Creek Dam, the South Boulder Diversion Conduit, Moffat Tunnel extension project. Bids Jan. 9. Noted Jan. 15, C. D.

†STEEL SUPPORTS—**Colorado**—Bureau Reclamation, Denver, structural steel supports for 5 metal flumes, Uncompahgre Project, Spec. 752-D, to Midwest Steel & Iron Co., 25 Larimer St., Denver, Colo. Bids Dec. 16. Noted Dec. 6, C. D.

STEEL RAILS—**Jacksonville, Fla.**—Atlantic Coast Line, Jacksonville, furnishing 6,000 tons steel rails, to Tennessee Coal Iron & R.R. Co., Brown Marx Bldg., Birmingham, Ala., $250,000. Owner will place rail by day labor and separate contracts.

PIPE—**McCammon, Idaho**—City, 350 tons 66 in. c.i. pipe, to Pacific States Cast Iron Pipe Co., Provo, Utah.

ROAD SIGNS—**Springfield, Ill.**—State Dpt. P. Wks. & Buildings, Capitol Bldg., miscellaneous road signs, to Grimm Stamp & Badge Co., 1309 Carr Lane, St. Louis, Mo., $4,607. Bids Dec. 16.

TREATED PILING, etc.—**Charles City, Ia.**—Floyd Co., Charles City, 2,000 lin.ft. treated piling, 55,691 ft. BM treated lumber; 3,475 ft. BM untreated Class C, and 22,500 ft. BM treated Class A lumber, to Frudden Bridge Lumber & Supply Co., Greene, $6,906. Bids Jan. 21, awarded Jan. 24.

LUMBER, etc.—**Logan, Ia.**—Harrison Co., 405,000 ft. BM green rough fir lumber, 9,500 ft. BM creosoted yellow pine lumber; 3,000 ft. creosoted yellow piling, to Nebraska Bridge Lumber & Supply Co., 730 Union State Bank Bldg., Omaha, Neb., $14,689. Bids Jan. 22, awarded Jan. 22. Noted Jan. 15, C.D.

LUMBER, etc. — **Vinton, Ia.** — Benton Co., 148,620 ft. BM lumber and 3,276 ft. piling, to Frudden Bridge Lumber & Supply Co., Greene, $8,405***culvert pipe, to Iowa Culvert & Pipe Co., 444 Insurance Bldg., Des Moines, $4,136***culvert pipe, to Zeidler Concrete Products Co., Waterloo, $294. Grand total $12,835. Awarded Jan. 21.

PIPE FITTINGS, etc.—**Fall River, Mass.**—City, City Auditor's Office, City Hall, furnishing pipe fittings, boiler supplies, to Corcoran Supply Co., 186 Plymouth Ave., $627***to Fall River Steam & Gas Pipe Co., 205 Bedford St., $972***to J. A. Neill Supply Co., 130 Bedford St., $1,382. Grand total $2,981. Bids Jan. 15. Noted Jan. 10, C. D.

CEMENT, etc.—**Austin, Minn.**—Mower Co., C. M. Hubbard, aud., 1,869 sacks cement delivered to warehouse, to Howely Yards, Austin, $1,075***58,400 lb. reinforcing steel, to Worden Allen Co., North Port Washington Ave., near West Capitol Dr., Milwaukee, Wis., $1,418. Bids Jan. 18. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

TRUCK CHASSIS—**Hastings, Minn.**—Dakota Co., M. H. Marshall, aud., one 5-6 ton, 4-wheel drive truck chassis, to Thorman W. Rosholt Co., 3138 Snelling Ave., Minneapolis, $7,100. Bids Jan. 14. Noted Jan. 9, C. D.

†CHANNELS, etc.—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., furnishing channels, I-beams, H-beams, angles, plates and bars, to Beck & Corbitt Co., 1st and Ashley Sts., St. Louis, $1,414. Est. $2,000. Bids Jan. 10, awarded Jan. 17.

†STEEL REINFORCING BARS—**Kansas City, Mo.**—U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, 8,994,000 cu.yd. steel reinforcing bars for Fort Peck Dam, to Youngstown Sheet Tube Co., Stambaugh Bldg., Youngstown, O., $256,631. Est. $180,000. Bids Jan. 18, awarded Jan. 24.

†CEMENT—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., 30,000 bbl. cement for Boulder Dam, to Union Portland Cement Co., Denver, Colo., $63,960. Bids Dec. 20.

†POWER SHOVEL—**Tucumcari, N. M.**—U. S. Eng., Tucumcari, purchasing 1 cu.yd. power shovel and one 50 ft. boom, to Bay City Shovel Co., Bay City, Mich., $10,750. Bids Dec. 19.

†PIPE—**New York, N. Y.**—Treas. Dpt., Procurement Div., 76 9th Ave., 500 tons 48 in. c.i. pipe, to U. S. Pipe & Fdry. Co., Burlington, N. J.

COMPRESSORS, etc.—**Troy, N. Y.**—City, City Hall, 3 air compressors, pneumatic drills and appurtenances, to E. A. Larkin Co., Albany. Est. $13,000.

ASPHALT EMULSION, etc.—**Cincinnati, O.**—City, to Ohio Pre-Cote Corp., American Bldg., furnishing 10,000 gal. asphalt emulsion, $850***to Standard Oil Co., 3426 Spring Grove, 10,000 gal. asphalt outback, $598; 12,500 tons asphalt cement, $17,037; and 900 tons bituminous material, $11,196***to Contractors Materials Co., Provident Bank Bldg., 125 tons asphalt filter dust, $3,110***to Brewer & Brewer Co., 906 Main St., 200 tons penetration asphalt, $4,180***to Kelly-Springfield Tire Co., 49 Central Ave., 70 tons bituminous material to Barrett Co., $719. Grand total $39,146.

BRICK, etc.—**Cincinnati, O.**—City, 40,000 select paving brick, to Contractors Material Co., Provident Bank Bldg., $1,025***50,000 paving brick, to Peebles Paving Brick Co., Portsmouth, $1,713***440,000 No. 2 hard burned common sewer brick, to Moores-Coney Co., Temple Bar Bldg., $7,700***90,000 sewer brick, to Suburban Supply Co., Reading Rd., Reading, $17,550. Grand total $27,988. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

HOSE PUMPERS, etc.—**Cincinnati, O.**—City, three hose pumpers and aerial ladder truck, to Mack International Motor Truck Corp., 1223 West 8th St., $55,677. Awarded Jan. 28.

RAILS—**Seattle, Wash.**—Street Railway Dpt., County-City Bldg., 500 tons 7 in. 82 lb. rails, to Bethlehem Steel Corp., Youngstown St., $32,810. Awarded Jan. 23. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

†CEMENT, etc.—**LaCrosse, Wis.**—U. S. Treas. Dpt., Procurement Div., 670 bbl. portland cement in paper bags for W.P.A. project, village of Humbird, to O. and N. Lumber Co., Humbird, $2.59 per bbl.; 400 ft. 42-in. rein.-con. sewer pipe, to W. Fehr, Bloomer, $4.55 per ft.

†CLAMSHELL BUCKET—**Milwaukee, Wis.**—U. S. Eng., Milwaukee, furnishing clamshell bucket, to J. F. Kiesler Co., 938 West Huron St., Chicago, Ill., $1,238. Bids Jan. 21, awarded Jan. 23. Noted Jan. 30, C. D.

†CEMENT—**Milwaukee, Wis.**—Treas. Dpt. Procurement Div., Wash., D. C., 600 bbl. portland cement in paper bags for W.P.A. projects, to Wauwatosa Fuel & Supply Co., 7700 Harwood Ave., Wauwatosa, $2.18 bbl.; 600 bbl. portland cement in paper bags, to Wisconsin Face Brick & Supply Co., 4485 North Green Bay Ave., $2.18 per bbl. Awarded Jan. 23.

†CHLORINATOR, etc. — **Milwaukee, Wis.** — Treas. Dpt. Procurement Div., Wash., D. C., 1 vacuum type chlorinator and 3 loss of head indicating gages, to Roberts Filter Mfg. Co., 630 Columbia Ave., Darby, Pa., $1,210 and $192 each, respectively***No. 8 dry feeder for aluminum and soda ash, to International Filter Co., 59 East Vanburn St., Chicago, Ill., $298 each. Awarded Jan. 20.

†LUMBER, etc. — **Milwaukee, Wis.**—Treas. Dpt. at office Procurement Div., Wash., D. C., to Wisconsin Lumber & Supply Co., 2782 South 13th St., 1,200 bd. ft. 3x6x16 maple hearts $29; 3,200 bd. ft. 2x6x16 maple hearts $27; 1,250 bd. ft. No. 1 common Idaho white pine boards $136***to Steinman Lumber Co., 500 East Keefe Ave., 233 bd. ft. 2x4x12, 14 yellow pine $32; 256 bd. ft. No. 3 common pine $57***to Stowell Lumber Co., 1980 South 4th St., 1,000 bd.ft. 1x6 random lengths yellow pine $29; 500 bd. ft. clear red cedar $73; 1,000 bd. ft. No. 2 white pine boards $81***to Hilty-Forster Lumber Co., 3846 West Wisconsin Ave., 500 ft. clear Redwood 1x12 $71; 10,240 bd. ft. 4x8x12 yellow pine $32; 500 ft. white pine board $69; 12,000 bd. bd. 4x8x10 ft. yellow pine $32;***to W. H. Pipkorn Co., 1546 West Bruce St., 11,826 lbs. billet steel concrete reinforcing bars $276; 3,750 lb. billet steel reinforcing bars $94***to North Side Fuel & Lumber Co., 1014 East Chambers St., 2,000 bd. ft. pine boards $67***to Tews Lime & Cement Co., 1136 North Ave., 22,000 face brick $22 per 1,000***to Wauwatosa Fuel & Supply Co., 7700 Harwood Ave., Wauwatosa, 3,000 ft. 6 in. concrete drain 75c.; 230 ft 4 in. concrete drain 45c.; 4,400 commercial brick $12.75***to J. Jones Co., 4020 Port Washington Rd., millwork $240***to Consumers Supply Co., 4135 West State St., 142 ft. 12 in. concrete supply pipe 43c.; 150 ft. 10 in 33c. and 850 ft. 8 in. 24c. Awarded Jan. 20.

WATER PUMPING EQUIPMENT, etc.—**Milwaukee, Wis.**—City, water pumping equipment, to O. A. Waskow, 222 West State St., $1,023; acoustical treatment, to Watson Eng. Co., 152 West Wisconsin Ave., $796. Bids Jan. 21, awarded Jan. 24.

CEMENT—**West Allis, Wis.**—Bd. P. Wks., City Hall, 1,500 sacks cement in cloth bags, to Schneider Fuel & Supply Co., 3438 West Forest Home Ave., Milwaukee, 65c. per sack. Bids Jan. 25, awarded Jan. 25. Noted Jan. 17, C. D.

†TRANSFORMERS, etc.—**Casper, Wyo.**—Bureau Reclamation, Denver, Colo., transformers, Schedule 1, to Pennsylvania Transformer Co., 1701 Island Ave., Pittsburgh, Pa., $19,386*** lightning arrestors, Schedules 2 and 3, to General Electric Co., River Rd., Schenectady, N. Y., $7,566***air break switches and expulsion fuses, to Johnson Mfg. Co., 978 Murphy Ave. S.W., Atlanta, Ga., $3,300***4 outdoor switching and metering units, to Kelman Electric & Mfg. Co., 1650 Naud St., Los Angeles, Calif., $4,575, all above for Cooper-Alcova Project. Grand total $34,827. Bids Nov. 12.

†*Federal Government.*

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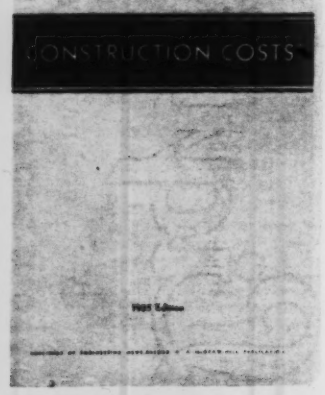

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FOREIGN

Argentina, Buenos Aires—Municipality will be in market in Spring, for granite blocks, wood blocks, asphalt and cement for paving purposes, also plans constructing public baths, $150,000. Details to be obtained from City Engineer.

Australia—Feb. 24, by **Melbourne** Town Clerk, for supplying 22,000 and 6,600 volt switchgear***Mar. 16, by State Electricity Commission of Victoria, **Sidney**, supplying electric cables of various grades and type. Address 32 King William St.

Australia, Brisbane—Apr. 24, by City Electric Light Co. Ltd., supplying 7 pole-type, 2 step automatic outdoor type booster transformers and supplying 5,829 ft., 25x25x25, 3 core land cable (2 cables).

British Guiana, Georgetown—British Colonial Office Committee on Education in conjunction with local government prepares plans for federal university for British West Indies. $1,000,000.

England—Bury Municipality receiving competitive plans for new town hall, J. H. Worthington, assessor***Harpenden** Municipality receiving competitive plans public hall, R. Lory, assessor***Harras** Municipality receiving bids municipal offices, C. H. James, assessor.

England — Hereford Municipality votes to construct and equip municipal aerodrome $500,000***Ilfracombe** Municipality purchases site for civic aerodrome***Cornwall** Electric Power Co., **Cornwall,** prepares plans extensions $600,000***Arena Co. Ltd., **Harrungay,** plans additions $500,000***Wandsworth & District Gas Co., **Wandsworth,** plans extensions $700,000 ***Urban District Council, **Staines,** plans 280 houses $520,000***Leicester** Municipality awards contract constructing 301 houses, to Simms Sons & Cooke Ltd., Nottingham, $306,755 ***Darlington** Boro Council voted scheme for civic center building $1,500,000***J. H. Morton & Son, Martins Bank Chambers, Fowler St., **South Shields,** preparing plans theatre $500,000 ***The Bentley Eng. Co. Ltd., **Leicester,** preparing plans plant New Bridge St., $650,000***Saltaire** Municipality plans hospital $1,000,000, site not purchased***J. G. Bulger engr., Birmingham, plans factory, **Pershore,** $750,000*** P. S. B. Nicolle, **Leeds,** prepares plans 235x400 ft. factory for Prices Ltd., $575,000***F. C. Mitchell, 80 George St., Hanover Square, **Acton,** constructing factory and warehouse building, to Kirk & Kirk, Upper Richmond Rd., S.W. London, $600,000***Huddersfield** Town Clerk taking bids constructing 332 houses on Sheepridge Estate $664,000***C. H. Matthews, clk. Urban District Council, **Stone,** taking bids constructing electricity power station on Newcastle Rd.*** D. L. Harbottle, Town Clerk, **Blackpool,** interested in prices of Universal Type excavator ¾ cu.yd. size on caterpillar tracks, driven by internal combustion engine; M. Thomas, Town Clerk, **Port Talbot,** taking bids 4,410 ft. 12 in. spun iron spigot and socket pipes, also c.i. specials***Middlesbrough** Municipality in market for four 250 kva. 2,750/400 volt three phase transformers***Chairman Electricity Committee, **Hull,** wants prices on electricity meters ***J. Entwistle, town clerk, **Heysham,** taking bids supplying substation equipment, twenty-five 400 kva. static transformers***A. J. Ryan, Boro Electrical Engineer, 12 York Bldg., **Hastings,** interested in prices, hard drawn, annealed and bare copper wire, insulated copper strand wire, cadmium copper wire, galvanized steel strand, copper earth plates, cables, electricity house meters, substation switchgear, 11,000 volts for year commencing April 1***Manchester** Municipality contemplating single phase fan motors, to General Electric Co. Ltd., Magnet House, Kingsway, W.C. London; 400 volt substation switchgear, to Parmiter, Hope & Sugden Ltd., Manchester; ammeters and current transformers, to Record Electrical Co. Ltd., Broadheath***West Hartlepool** Municipality drainage scheme, to J. W. Pearson & Co., West Hartlepool, $500,000***Kettering** Municipality 40,000 yd. 12,500 volt 15 square in. 3 core paper insulated lead covered steel tape armoured cable, to Union Cable Co. Ltd., Dagenham Dock, Essex, $107,600***J. W. Wilton, Millmead House, **Guildford,** on behalf of Rural District Council, awarded contract for sewerage scheme, to Speight & Partners Ltd., Kingsway, W.C. London, 1st section at $872,390; to Bolton & Lakha Ltd., Birmingham, 2nd section, $834,780; to Squire & Son Ltd., Selby, 3rd section, $807,830.

England—J. E. Webb & Co., archts., plans 400 houses, **Dunstable,** $810,000***Adams, Holden & Pearson, 9 Knights Bridge S. W., London, plans hotel on Sydall Estate, **Manchester,** $1,250,000***Kent County Council Public Assistance Committee, **Maidstone,** plans by W. H. Robertson, Lyminge Hospital addition, $725,000***Robert Atkinson, 13 Manchester Square West, **Acton,** plans municipal office addition for Boro Council, $490,000***Huddersfield** Municipality voted $500,000 for new hospital ***Percy Thomas, 7 St. Johns Square, Cardiff, plans civic center, **Worcester,** $1,000,000*** **Southend** Borough Council voted $1,700,000 for constructing metal hospital at Rochford*** Lancashire County Council, **Ormskirk,** receiving competitive plans for mental hospital, $6,250,000***R. T. Warren, **Southall,** plans 287 houses at Hayes Gate, $574,000***New Ideal Homesteads, Ltd., Carlton Rd., **Erith,** plans 302 houses at Edmonton $604,000***H. C. James, Ltd., Hitchen Road East, **Luton,** plans 682 houses, $1,364,000***Thomas Tatham, 32 Caskgate St., **Gainsborough,** representing Whitton, Ltd., constructing 7 story flour mill ... Pumfrey, Ltd., **Wintern Wks.,** Carlisle*** Industrial Service Ltd. Northside Rd., Bradford, plans addition, $450,000***Bengers Food Ltd. Otterwirks, Strangeways, plans by L. ... drews & Butterworth, 9 St. James Square ... structing factory on 14 acre site, **Manchester,** $1,000,000***F. Pierce & Son, 30 St. ... gate, **Stockport,** plans 600 houses for ... West, $1,135,000***G. F. Gregory, 32 ... Rd., **Ilford,** taking bids supplying and ... E.T.T. metal clad switchboard with ... bussbars***Bilston** Municipal architect ... 276 houses at Millfield, $475,000, and ... houses at St. Chad, $631,000***Leeds,** Mpal Housing Comm. plans 700 houses at ... $1,100,000***Governors of Williams ... Caerleon, plans developing Trebeth Estate ... erecting 800 houses, **Newport,** $1,725,000 *** J. H. Milne, **Bedlington,** plans large cycle ... facturing building***Wolverhampton** Mun. ... Engineer taking bids constructing 4 gravity ... terial beds of $10,000 cu.yd. capacity ... necessary humus tanks and other accessories.

England—H. Plowman, town clerk, **Burnley,** in market for one 14 ton gasoline driven ... roller***J. Poole, clk. Urban District Council, 265 High St., **Uxbridge,** wants prices of ... bined cesspool and gully emptier, 500 gal. capacity, with piping and accessories***W. G. Davies, archt., **Sheffield,** prepares plans ... houses on Shirecliffe Estate, for municipality $789,600***Warrington** Municipality plans ... extension to electrical mains and services*** **Chanctonbury** Rural Dist. plans construction reservoir at Upper Nash***Shipston-on-Stour** Municipality voted water scheme, $327,000*** **South Shields** Municipality voted $580,000 for riverfront development***North Cotswold** Rural District Council plans water scheme involving almost $1,000,000 expenditure***North Westmoreland** Rural Dist. Council plans water scheme, $410,000***Saffron Walden** Rural District Council voted $550,203 for water scheme ***Rotherham** Town Council plans booster plant at Conisborough***Mansfield** Town Council plans water softening plant, pumping stations, softener house and storage building*** **Halifax** City Clerk interested in prices of gas meters, $25,000 available***E. M. Lawson, 19 Ridley Pl., Newcastle-on-Tyne, prepared plans theater for S. C. Miller, **North Shields,** $400,000 ***Drury & Gomersall, 15 Imperial Bldgs., Oxford Rd., Manchester, prepares plans theater for J. T. L. Mallard, **Stockport,** $350,000*** **Chesterfield** Town Council voted $500,000 for house construction on Sheffield Rd.***Leicester** Housing Com. invites tenders for constructing 307 houses on Northfield Estate, $528,760*** **Hull** Town Council takes bids in March 468 houses at Bilton Grange, $982,800***Derby** Town Council bids in March constructing 600 houses, $1,500,000 available***Brandon** Urban District Council plans new isolation hospital, $750,000***Hull** Town Council votes $570,000 for court house***H. Davies, **Whitby** preparing plans hospital for Rural District Council, $1,250,000***Public Assistance Committee, **Northumberland,** plans old folks home, $575,000*** **Tipton** Urban District Council votes for 400 houses at Tibbington Estate. $925,000*** **Walsall** Town Council voted to construct 800 houses***Beckett & Bloore, Kingsway, preparing plans developing Holden Estate, **Stoke-upon-Trent,** $2,000,000***Worthing** Town Council voted $633,470 for surface drainage scheme*** Rivers Catchment Bd., **Somerset,** plans by F. B. Goodman, Bridgewater, for drainage scheme, $2,725,000 available***P. Thomas, pres. Royal Institute of British Architects, **London,** plans reconstructing Euston Station for London, Midland and Service R.R., $5,000,000***Liverpool** City Electrical Engineer, 24 Hatton Garden, taking names of those wishing to bid on cables, insulated cables, electric meters, incandescent electric lamps, brass and copper castings, electric motors, and starting gear, stoneware, troughing for year 1936.

England—Salford Town Council taking bids transformers, $28,300***Burnley** Town Council taking bids substation equipment, $25,000*** **Manchester** Town Council taking bids substation equipment, $100,000***Isleworth** Town Council taking bids transformers and switchgear, $9,255***Liverpool** Town Council taking bids transformers and switchgear, $28,875*** **Rotherham** Town Council taking bids 2 connersville compressors, $5,500.

England, London—Feb. 25, by Director General Indian Stores Dpt., Belvedere Rd., Lambeth, S. E., London, plans supplying 1 non-propelling pontoon type bucket hopper dredger, and 3 hopper barges of 20,000 cu.yd. capacity, speed of 10 knots.

England, Stoke-on-Trent — British Aluminum Co., Ltd., London, plans constructing aluminum rolling mills, $800,000.

Holland, Amsterdam—Government plans reclamation of Zuyder Zee, 1st section 117,500 acres in northeastern section, making Urk and Schokland Islands part of main land. $85,000,000.

India, Rangoon—Municipality plans by Binnie, Deacon & Gourlay, constructing waterworks, incl. storage reservoir, 136 ft. high, booster station and 44 mi. pipe line. $1,000,000.

Mexico—Tourist Camp Co., Ciudad Victoria, Tamps, Mexico, P. Rubio, Ortiz, pres., making plans constructing tourist camp, incl. garage, repair shop, gasoline facilities, restaurants, stores, etc., between Valles and Tamazunchale also tourist camp, incl. cottages, restaurant-

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†*Federal Government*

Foreign (Continued)

bars, gasoline and garage repair service, stores and facilities, at Jacala Hidalgo; and 5 story hotel at Ciudad Victoria. Contractors and dealers should communicate with owner.

New Zealand—Mar. 9, by Director of Stores, G.P.O., **Wellington,** supplying 500 5 MFD and 1,000 2 MFD metal clad condensers; Mar. 11, supplying 2,500 fuses (alarm and inductor alarm types), and 50 el fuse wire; Mar. 16, for supplying 12 hydrometers***Mar. 27, by **Dunedin** City Clerk, supplying two 3 phase 50 cycle, 31,150/6,600 volt transformers, also 6,600 volt and 35,000 volt switchgear***Apr. 21, by Public Works, Supplies & Tenders Committee, **Wellington,** supplying one 50 kw. 3 phase 415 volt, 50 cycle Diesel engine driven generator set***Secretary of Public Works, Supplies & Tenders, **Wellington,** is receiving names of intending bidders for 1936 requirements of motor driven pumps, motor control equipment, oil immersed self-cooled single phase transformers, switchgear, etc.***Director General, Stores Division, Post Office, **Wellington,** automatic dials, insulating plates and springs, copper wire, insulated bronze wire, fuses and fuse wire, copper binding and cadmium copper wire, unburnt plate (lead type), inductor coils, etc.

Siam, Bangkok—Royal Siamese Government, c/o Ministry of Public Works, soon takes bids harbor construction, incl. dredging 28 ft. depth, constructing wharves, warehouses. Est. $9,120,000.

South Africa—African Explosive & Industries Ltd., **Modderfontein,** plans constructing 500 tons cyanide pilot plant***Imperial Chemical Industries Ltd., **Witwatersrand,** prepares plans constructing manufacture of cyanide plant $700,000***South African Railways & Harbours, **Johannesburg,** prepares plans 600 ft. extension to breakwater and other harbor improvements, **East London**•••T. H. Watermeyer, mgr. South African Railways & Harbours Administration, **Johannesburg** invites cable tenders for supplying 10 ton overhead electric traveling crane*** **Johannesburg** Municipality plans purchasing in spring 125 ft. high capacity gas meters.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Bakersfield—Kern Co. Union High School Dist., voted $200,000 bonds to finance high school improvements, incl. $150,000 for classroom building and repairs to girls' gymnasium at Bakersfield High School, and $50,000 for additional school. Bids latter part of February. C. H. Biggar, Haberfelde Bldg., archt. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Calif., Camarillo—State plans by G. B. McDougall, state archt., P. Wks. Bldg., Sacramento, rein.-con. cold storage and ice plant, ward and industrial units, on state hospital grounds. To exceed $150,000.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., plans by S. P. Hunt, 701 Laughlin Bldg., 64x220 ft. and 58x171 ft. Class A school buildings, both 2 story, at Virgil Junior High School, 152 North Vermont Ave. W. Mellema, 1661½ Beverly Blvd., and E. L. Ellingwood, H. W. Hellman Bldg., engrs.

Calif., Oakland—Alameda Co. (Fairmount Hospital), plans by W. G. Corlett, Bank of America Bldg., Oakland. Class "A" hospital wards. $175,000.

★ **Calif., Sacramento**—Sacramento City School Dist. plans by Starks & Flanders, Forum Bldg., senior high school shops, laboratory, gymnasium, cafeteria and auditorium. Total est. $715,000. Plans awaiting P.W.A. approval.

†**Conn., Clinton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S Post Office, Commerce and Clinton Sts. $75,000.

†**Ill., Anna**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 2 story, basement, brick, rein.-con. post office. $72,000 appropriated.

†**Ill., Champaign**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids construcing rein.-con., brick, stone post office. $175,000 appropriated.

Ill., Chicago—Bd. Educ., 228 North LaSalle St., plans by J. C. Christensen, 238 North LaSalle St., two 2 story, basement, 70x100 ft. schools, one at Oak Park and Foster Aves., and other at Hiawatha St. and Kilpatrick Ave. $121,000 each.

†**Ill., Geneva** — Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 2 story, rein.-con., brick, stone post office. $84,000 appropriated.

Ind., Fort Wayne—Bd. School Trustees, M. J. Abbet, supt. Schools, 1230 South Clinton St., plans by A. M. Strauss, 415 Cal-Wayne Bldg., for South Side High School, 2 story, basement, $300,000; plans by Pohlmeyer & Pohlmeyer, 206 Central Bldg., 2 story, basement addition to Central High School, $250,000. Maturity in 1937.

Ind., Gary—Bd. Educ., L. J. Combs, pres., 524 Garfield Ave., sketches by J. H. Wildermuth, 755 Archer Ave., school, 6th and Massachusetts Ave. $150,000.

Federal Government.

Ia., Rock Rapids—City sketches constructing power plant and distribution system. $200,000. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs. Noted Sept. 3, C. D.—Sept. 5, E. N.-R.

Kan., Iola—Municipality received $280,600 P.W.A. loan and grant for improvements to municipal plant, comprising new steam generating equipment, dam to impound condenser, cooling water and repairs to distribution system. Paulette & Wilson, Salina, engrs. Noted Sept. 16, C.D.—Sept. 19, E.N.-R.

†**La., Alexandria**—Vet. Bureau, Arlington Bldg., Wash., D. C., plans constructing hospital addition to administration building. $140,000.

Mass., Holyoke—City, W. P. Yoerg, City Hall, plans by Franz & Cunniff, 316 High St., war memorial building. Project temporarily in abeyance. $215,000. **Maturity indefinite.**

Mass., Westfield—City, Bd. Educ., R. H. Cowing, mayor, City Hall, plans by R. M. Sizer, 12 Elm St., Junior High School, brick, steel, concrete found. $300,000.

Mich., Charlotte—Bd. Educ. plans by Warren S. Holmes Co., Lansing, brick, rein.-con., steel school, plain found. $249,000. P.W.A. project.

★ **Mich., Detroit**—Bd. Educ., 1354 Broadway Ave., plans 3 story, brick, steel school, plain found., Chandler Park. $586,000. P.W.A. asked for grant of $125,000 to aid in financing construction of same. Architect not appointed.

Mich., Northville—Bd. Educ. plans rebuilding public school. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

†**Mo., Higginsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing, rein.-con., brick, stone post office. $64,000 appropriated.

†**Mo, University City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 2 story, basement, post office, on 210x200 ft. site, Trinity and Washington Aves. $125,000 appropriated Noted Aug. 30, C. D.—Sept. 5, E. N.-R.

†**Mo, Wellston**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids 2 story, basement, rein.-con., brick, stone post office, $142,000 appropriated. Noted Aug. 30, C. D.—Sept. 5, E. N.-R.

★ **N. Y., Newburgh**—Bd. Educ. bids after Feb. 15, constructing North End School, Robinson Ave. $1,215,000. Knappe & Morris, 192 Lexington Ave., New York, archts. P.W.A. project. Noted Dec. 19, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

N. Y., Saranac Lake—City plans power plant and distribution system. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

†**N. C, Elizabeth City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., revised plans constructing U. S. Post Office. $102,000. Bids Dec. 20 rejected. Noted Dec. 26, C. D.—Dec. 5, E. N.-R.

†**N. C., Warrenton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office, on site opposite Hotel Warren. $62,000. Site acquired.

O., Sandusky—City plans new power plant, Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

★ †**Pa., Phila.** — Treas. Dpt. at office Sup. Archt., Wash., D. C., plans by Ballinger Co., 105 South 12th St., constructing court house, 9th and Market Sts. $3,500,000.

Tex., Galveston—John Sealy Hospital, Galveston, plans fireproof hospital building for negro patients, incl. operating rooms, convalescing rooms, laboratory, etc., $250,000. P.W.A. approved grant. Noted June 17, C. D.—June 20, E. N.-R.

Tex., San Antonio — Bd. Educ., c/o P. S. Menefee, pres., Lavaca and Matagorda Sts., plans by Phelps & De Wees, Gunter Bldg., San Antonio, 2 story, auditorium, plain found. at Junior-Senior High School, Durango St. $140,000.

★ **Wash., Bellingham**—Bd. Educ., plans by F. A. Naramore, Central Bldg., Seattle, for high school, $750,000; plans by F. S. Piper, Herald Bldg., addition to Columbia grade school, housing heating plant, auditorium, cafeteria and play room; plans by Wohleb & Stanton, Herald Bldg., addition to Whatcom High School gymnasium. Total est. $985,000.

BIDS ASKED

†**Ariz., Tucson**—Feb. 28, by Vet. Bu., Arlington Bldg., Wash., D. C., altering administration building at U. S. Veterans Facility. Noted Jan. 13, C.D.—Jan. 16, E.N.-R.

Calif., Los Angeles—Feb. 20, by Bd. Educ., reconstruction of Belvedere School, 3724 1st St., $67,000. Noerenberg & Noerenberg, 1060 South Broadway, archts. and engrs.

†**Calif., Santa Barbara**—Feb. 20, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator in U. S. Post Office.

Conn., Ansonia—Feb. 18, by City, E. W. Webb, School Comn., City Hall, brick, steel high school, $423,000. P.W.A. project. W. Lescaze, 211 East 48th St., New York, archt. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

†**D. C., Wash.**—Feb. 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing metal stacks, filing equipment, etc., for Archives Building, Contr. 2.

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Immediate
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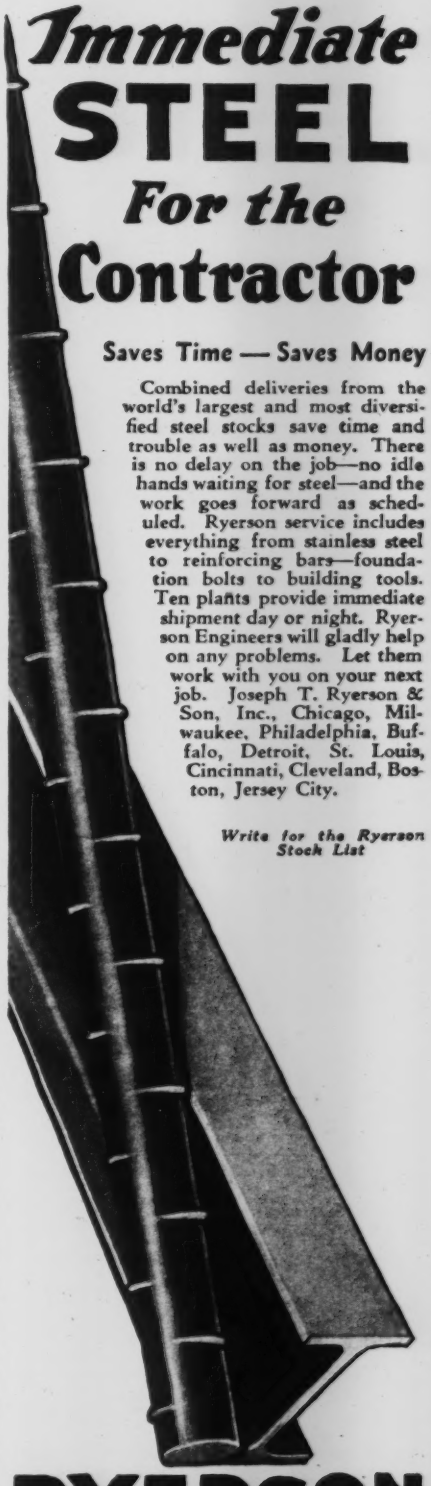

RYERSON STEEL-SERVICE

Public Buildings (Continued)

†**D. C., Wash.**—Feb. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., sprinkler system, etc., in Interior Department Building.

†**D. C., Wash.**—Feb. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing roof repairs at U. S. Post Office.

†**D. C., Wash.**—Mar. 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing connecting tunnel for Dpt. Interior Buildings.

Ill., Springfield—Feb. 13, by Bd. Educ., 206 Adams St., L. Burtle, secy., constructing Highlands School addition and repairing Central School roof. P.W.A. project. M. S. Hanes, archt. for former, and R. A. Bullard, archt. for latter schools.

†**Ind., Delphi**—Feb. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Ind., Evansville—Mar. 7, by Bd. Comrs. Vanderburg Co., constructing 2 story, basement administration building for tuberculosis hospital. $167,000. Bids Jan. 17 rejected. P.W.A. project. H. E. Boyle & Co., Inc., 405 Furniture Bldg., archts. Noted Jan. 24, C. D.—Dec. 19, E. N.-R.

Ind., Kokomo—Feb. 28, by Comrs. Howard Co., constructing 3 story, basement, stone, steel court house, incl. plumbing, heating, electrical work and elevators. $350,000. P.W.A. project. O. Cook, 622 Landen Bldg., archts. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

†**Mass., Rutland**—Feb. 11 (extended date), by Vet. Ba., Arlington Bldg., Wash., D. C., furnishing elevator and altering Building 21 at U. S. Veterans Hospital. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Mo., Fulton—Feb. 13, by State Building Comn., Bi-Partisan Advisory Bd., Jefferson City, constructing additions to main group at State Hospital 1. C. A. Haskins, ch. engr. and archt. L. R. Bowen, supervising archt. Eleemosynary Institutions. Hoerer, Baum & Froese, archts. $300,000. P.W.A. project.

N. J., Leonia—Feb. 21, by Bd. Educ., Leonia High School, constructing addition to existing school, in Bergen Co. $153,700. P.W.A. project. Noted Dec. 26, C. D.—Jan. 2, E. N.-R.

N. M., Albuquerque—New Mexico University bids about Mar. 21, heating plant, $156,000; bids about Mar. 28, for state health laboratory, $57,000; bids about May 16, student union building, $105,000; and bids about Sept. 26, library, $370,000, all on University Campus. J. G. Meem, Sante Fe, archt.

N. Y., Brooklyn—Feb. 11, by W. C. Martin, archt. and supt. school Buildings, Flatbush Ave. Extension and Concord St., plumbing, drainage, heating, ventilating, electrical work for P.S. 247, 21st Ave. from 70th to 71st Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., Brooklyn—See "Contracts Awarded."

†**N. Y., Buffalo**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator plant in court house.

N. Y., Coxackie—Feb. 11, by Commissioner correction, State Office Bldg., Albany, construction, heating, sanitary, electrical work, special work, for staff accommodations for Buildings 26, 27, 28, 29 and 30, New York State Vocational Institution.

N. Y., Dannemora—Feb. 20, by Commissioner Correction, State Office Bldg., Albany, construction, heating, ventilating, electrical work, special fixtures for cell block and administration building, Clinton Prison.

N. Y., Jamaica—Feb. 18, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing heating system for Jamaica Yard Buildings, for Independent City-Owned Rapid Transit R.R., Contr. Y-81.

N. Y., Newark—Feb. 19, by Commissioner Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary and electrical work for Newark State School.

★ **N. Y., Newburgh**—Feb. 10, by Bd. Educ., general contract heating, plumbing, electrical work for 2 story, 200x300 ft. school, Monument St. $668,250. P.W.A. project. Starrett & Van Vleck, 267 5th Ave., New York, archts. Purdy & Henderson, 45 East 17th St., New York, engrs. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

N. Y., New York—Feb. 11, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., Brooklyn, general contract P.S. 113, Barnes Ave. between 216th and 217th Sts., also for excavating, grading for Bronx Industrial High School, Tinton and Union Aves. between 161st to 163rd Sts., both Bronx Boro.

N. Y., New York—See "Contracts Awarded."

O., Sandusky—Feb. 20, by Bd. Comrs. Erie Co., constructing 3 story, basement court house additions and alterations. $150,000. Bids Dec. 13 rejected. P.W.A. project. H. C. Milliott, 814 West Washington St., archt. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Pa., West Pittston—Feb. 11, by School Dist., c/o S. H. Wilson, pres., 120 Warren St., 2 story, basement, brick, wood school, plain found., incl. gymnasium, classrooms, etc. $140,000. T. A. Foster, Brooks Bldg., Wilkes-Barre, archt.

†**Tex., Fort Worth**—Feb. 25 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing buildings, roads, etc., on U. S. Narcotic Farm. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

†**Vt., Beebe**—Mar. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing inspection station. Noted Apr. 4, C. D.—Apr. 18, E. N.-R.

†**Va., Charlottesville**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office and Court House. $162,000.

†**Va., Roanoke**—Feb. 11, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing nurses' quarters; addition to present quarters at Infirmary Building 12.

Wash., Spokane—Feb. 18, by L. V. Murrow, dir. Hys., Olympia, altering and constructing addition to District Office Building, at Spokane, Unit 2, Public Wks. Project 1242, Spokane Co. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Washington."

†**Wash., Spokane**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., installing complete elevator plant in U. S. Post Office, known as Havermale Station.

Que., Valcartier—Dpt. Natl. Defence, L. R. LaFleche, deputy minister, Ottawa, Ont., taking bids (from selected list of bidders), constructing 4 houses (ultimately 12 houses). $200,000.

LOW BIDDERS

★ **Mo., Kansas City**—City, Jan. 30, constructing city hall, from Swenson Constr. Co., Shubert Bldg., $1,497,989. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

CONTRACTS AWARDED

Calif., Berkeley—K. E. Parker Co., general contractors, 135 South Park St., San Francisco, electrical work for school reconstruction, to Spencer Electric Co., 2059 Webster St., Oakland, for Berkeley School Dist.***painting, to A. A. Zelinsky, 3011 Steiner St., San Francisco ***structural steel, to Herrick Iron Wks., 18th and Campbell Sts., Oakland. **P.W.A.** Noted Jan. 17, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Calif., Del Rey—T. C. Irwin, general contractor, 269 North Fulton St., Fresno, electrical work for school, to F. P. Vandergriff, Selma, for Prairie School Dist.***excavating and concrete work, to H. Fosnaugh, Sanger***painting, to Eddy Paint Co., Porterville***iron and steel, to Kyle Co., Fresno. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Los Gatos—J. D. Carlson, general contractor, 1331 Sierra Ave., San Jose, electrical work for high school addition, to R. Butcher, 1020 Sherwood Ave., San Jose, for Los Gatos Union High School Dist.***sheet metal, to W. Serpa, 497 North 13th St., San Jose***iron work, to Enafer Iron Wks., P. O. Box 11, San Jose***painting, to G. Smith, Los Gatos***reinforcing steel, to San Jose Steel Co., 1344 The Alameda, San Jose***structural steel, to Enafer Iron Wks., P. O. Box 11, San Jose. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Calif., Red Bluff—Sjoberg & Son, general contractors, 5604 East 16th St., Oakland, steel sash for high school gymnasium, to Detroit Steel Products Co., 1319 63rd St., Oakland, for Red Bluff Union High School Dist.***reinforcing steel, to Truscon Steel Co., Atlas Bldg., San Francisco***structural steel, miscellaneous and ornamental iron work, to Independent Iron Wks., 821 Pine St., Oakland***painting, to M. A. Miller, 3664 Madrone Ave., Oakland*** electrical work, to Cox Electric Co., Red Bluff. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Los Angeles—Bd. Educ., reconstructing, rehabilitating, strengthening auditorium section and annex building at Malabar St. School, 3200 Malabar St., to H. A. Nichols, 936 East Slauson Ave., $20,081***1 story, 58x229 ft. new school building at San Fernando School, to Brunzell & Jacobson, 2150 Princeton Ave., $62,790***1 story, 100x131 ft., rein.-con. school, 1015 South Lorena St., to Blystone & Van Tuyle, 136 Walnut St., Brea, $52,100***1 story, 57x191 ft. new school building, 612 West 68th St., to H. F. Miller, 1908 West 75th St., $57,515. Grand total $192,486. Bids Dec. 27, awarded Jan. 16. **P.W.A.**

†**Calif., San Diego**—Yards & Docks, Navy Dpt., Wash., D. C., constructing passenger elevator at Naval Hospital, Spec. 8100, to Otis Elevator Co., 810 18th St. N.W., $21,990. Bids Jan. 22. Noted Jan. 28, C. D.

Calif., San Francisco—Lindgren & Swinerton, general contractors, 225 Bush St., reinforcing steel for administration building, Bush and Stockton Sts., for City and San Francisco Co., to W. C. Hauck & Co., 280 San Bruno Ave.*** miscellaneous iron, to Monarch Iron Wks., 242 7th St.***sheet metal, to Guilfoy Cornice Wks., 1234 Howard St.***waterproofing, to Horn Products Co., 557 Market St.***plumbing and heating, to M. J. Reevex, 959 Natoma St.*** electrical work, to Alta Electric & Mechanical Co., 467 O'Farrell St.***painting, to Aristo Painting Co., 473 Bryant St.***concrete mix, to Golden Gate Atlas Materials Co., 16th and Harrison Sts. Noted Jan. 7, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., San Rafael—De Luca & Son, Inc., general contractors, 1745 Filbert St., San Francisco, electrical work for school, for San Rafael School Dist., to L. H. Leonardi, San Rafael*** plumbing and heating, to Scott Co., 243 Minna St., San Francisco***painting, to W. G. Thompson, 336 Church St., San Francisco***reinforcing steel, to Wetenhall Co., 17th and Wisconsin Sts., San Francisco***sheet metal, to Guilfoy Cornice Wks., 1234 Howard St., San Francisco. **P.W.A.** Noted Jan. 15, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Calif., Santa Rosa—Supervs. Sonoma Co., 1 story, steel, rein.-con. county hospital, to J. J. Walker Co., Sharon Bldg., San Francisco, $121,080. Bids Jan. 16, awarded Jan. 27. Noted Jan. 27, C. D.—Oct. 17, E. N.-R.

Calif., Sebastopol—A. Nelson, Inc., general contractors, 242 Ocean Ave., San Francisco, reinforcing steel for school, for Analy High School Dist., to Pacific Coast Steel Co., 20th and Illinois Sts.***miscellaneous iron, to Anchor Post Fence Co., 400 Fifth St., San Francisco***plumbing and sheet metal work, to F. Davison, 375 Monterey Blvd., San Francisco***overhead doors, to C. J. Walker Co., Sharon Bldg., San Francisco***electrical work, to San Carlos Electric Wks., San Carlos***painting, to A. A. Zelinsky, 3011 Steiner St., San Francisco***steel windows, to Detroit Steel Products Co., 111 Sutter St., San Francisco. **P.W.A.** Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Stockton—O. H. Chain, general contractors, 41 South Sutter St., Stockton, electrical work for warehouse, for City, Port Dist., to Collins Electric Co., 708 East Market St.***painting, to J. F. Ecker, 17 West Pulpit St.***concrete work, to A. Sandberg, R.F.D. Box 2, Stockton***sprinkler system, to Grinnell Co. of Calif., 5th and Brannan Sts., San Francisco***reinforcing steel, to F. A. Klinger, P.O. Box 757***plumbing, to Miller-Hayes Co., 42 East Weber St. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Conn., Guilford—E. and F. Constr. Co., general contractors, 94 Wells St., Bridgeport, addition for high school, to Hubbard's Tinker Shop, 23 Water St., for Town, School Bd. Noted Jan. 23, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Conn., New Britain—Bd. Educ., 3 story basement, 147x185 ft., T-shaped annex to Roosevelt School to serve as East Side Junior High School, Goodwin St., to Michael A. Connor, 15 Standish St., Hartford, $143,850***plumbing and heating, to C. N. Flagg, Meriden, $30,950 ***electrical work, to Perry Electric Co., 449 New Britain St., Hartford, $7,784. Grand total $182,593. **P.W.A.** Bids Jan. 15, awarded Jan. 22. Noted Jan. 24, C. D.—Dec. 26, E. N.-R.

Conn., Stratford—Hans Christensen, general contractors, 100 Chalmers Ave., Bridgeport, limestone for school, North Parade St., Town, W. H. Shea, town mgr., to Indail Stone Co., Bedford, Ind.***steel sash, to Detroit Steel Products Co., 2250 East Grand Blvd., Detroit, Mich.***blackboards, to Hartford Cement Co., 51 Homestead Ave., Hartford***plumbing, heating, to Mitchell & Bailey, 756 Railroad Ave., Bridgeport***electrical work, to Electric Shop, 2378 Main St.***painting, to C. L. Parsons, 795 Nichols Ave., Stratford***millwork, to Frank Miller Lumber Co., 125 East Wash Ave., Bridgeport***steel joists, to Kalman Steel Co., 75 Federal St., Boston, Mass.***metal base, to Knapp Bros., Joliet, Ill.***terrazzo floors, to Doolittle Tile Co., Main St., Bridgeport***roofing, to Fanton & Roberts, 80 Pine St., Hartford. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Conn., Stamford—Municipality, Municipal Offices, municipal building. Project indemnity in abeyance. Mayers, Murray & Phillips, 2 West 47th St., New York, archts. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

★ †**D. C., Wash.**—Federal Reserve Bank, Treas. Dpt., Wash., D. C., constructing Georgia marble federal reserve building, Constitution Ave., to George A. Fuller Co., Munsey Bldg., $3,484,000. Bids Jan. 29. Noted Jan. 31, C. D.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., altering basement Department of Justice Building to provide restaurant in basement, to Thum Co., Inc., 412 Insurance Bldg., Wash., D. C., $11,803.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., connecting wing building, sculptural stone carving, to Edward Ardolino, 286 5th Ave., New York, N. Y., $22,000.

†**D. C., Wash.**—Officer Quartermaster General, air conditioning in northwest wing Army Medical Center, to Raisler Heating Co., 129 Amsterdam Ave., New York, $7,450***heating and ventilating, to Norair Eng. Co., 18th St. N.W., $5,700***cubicles and their installation, to Dahlstrom Metallic Door Co., Jamestown, N. Y., $37,822. Grand total $50,972.

Ill., Elgin—Dpt. P. Wks. & Buildings, Div. Architecture, Springfield, pipe covering for heating and plumbing systems, for Infirmary Buildings 1 and 2, Elgin State Hospital, to Standard Asbestos Mfg. Co., 820 West Lake St., Chicago, $3,675 and $2,865 respectively*** plumbing, incl. water serv., to F. J. Bero Co., 323 South Commonwealth Ave., Chicago, $5,489***electrical wiring, to Hoffman Electric Co., 2525 West Van Buren St., Chicago, $17,650***sterilizing equipment, to Scanlon Morris Co., Madison, Wis., $3,927. **P.W.A.** Bids Jan. 14, awarded Jan. 24. Noted Jan. 24, C. D.—Jan. 9, E. N.-R.

†**Ill., Hines**—Vet. Bu., Wash., D. C., replacing elevator door equipment, etc., at Veterans Hospital, to Otis Elevator Co., 810 18th St. Wash., D. C., $3,541.

†*Federal Government*

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Public Buildings (Continued)

Ill., **Jacksonville**—Bd. Educ., general contract 2 reinforced-con., brick school buildings, to Smiri & Gibson, 203 Hopper Bldg., $85,306***plumbing and sewering, to Carson Payson Co., 616 North Jackson St., Danville, $6,262***heating, ventilating and temperature control, to D. F. Edwards Heating Co., 2340 Pine St., St. Louis, Mo. **P.W.A.** Bids Dec. 23. Noted Dec. 12, C. D.

Ill., **Rock Island**—Illinois Armory Bd., Springfield, general contract armory, to Coath & Goss, 228 North LaSalle St., Chicago, $258,350*** heating and ventilating, also plumbing, to McHeating and ventilating, also plumbing, to McKay, 226 17th St., $24,870 and $14,610 respectively***wiring, to Leithner & Weishar, 1816 3rd Ave., Rock Island, $6,209. Grand total $298,429. **P.W.A.** Bids Jan. 10. Noted Dec. 12, C. D.

Ind., **Mount Vernon**—Bd. P. Wks., J. M. Bennett clk., distribution system for municipal gas plant and distribution system, to C. I. Tenny Engr. Co., 316 Frontenac Bldg., Minneapolis, Minn., $17,136***gas generating equipment, to J. Tockman & Son, Inc., 310 Lincoln Ave., Evansville, $15,895***meters, to American Meter Co., 122 South Michigan Ave., Chicago, Ill., $2,320. Grand total $35,352. **P.W.A.** Bids Jan. 24. Noted Jan. 16, C. D.—Nov. 21, E. N.-R.

★ **Md., Baltimore**—Bd. Awards, 3 story, basement new Eastern High School, Venable Park, to M. A. Long Co., 10 West Chase St., $1,342,000. **P.W.A.** Bids Jan. 15, awarded Jan. 29. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

†**Md., Glenn Dale**—District Comrs., District Bldg., Wash., D. C., constructing Building C, nurses' home, Tuberculosis Sanatoriam, near here, to Northeastern Constr. Co., 6 West Madison St., Baltimore, $161,161. Bids Jan. 3. Noted Jan. 9, C. D.

Mass., Boston—R. J. Connolly, Inc., general contractors, 1146 Dorchester Ave., Dorchester, heating for public welfare building, Hancock St., to J. W. Praught & Co., 1049 Dorchester Ave., Dorchester, for City of Boston, Overseers of Public Welfare, 43 Hawkins St., Boston. Noted Jan. 17, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Mass., Fitchburg—Turner Constr. Co., general contractors, 143 Newbury St., Boston, heating for Senior High School, Academy St., for Bd. Educ., to V. J. Kenneally Co., 251 Causeway St., Boston***plumbing, to C. H. Cronin, Inc., 14 Byron St., Boston***electrical work, to Hixon Electric Co., 22 Elkins St., South Boston ***structural steel, to N. E. Structural Co., 310 Second St., Everett***reinforcing steel, to Concrete Steel Co., 294 Washington St., Boston*** granite, to Rollstone Granite Co., Rollstone Hill, Fitchburg***paint, to H. Newton Marshall Co., 522 Harrison Ave., Boston***glazed terra cotta, to National Fireproofing Corp., 142 Berkeley St., Boston***water struck brick to N. E. Brick Co., 22 Beacon St., Boston***excavation work to Chas. A. Wright, 8 Scott St., Springfield***cement, to W. E. Aubuchon Co., 73 Fairmount St.***sand and gravel, to P. J. Keating Co., 107 Kimball St. Noted Jan. 20, C. D. —Jan. 23, E. N.-R., under "Contracts Awarded."

Mass., Plymouth—D'Amore Constr. Co., general contractors, 89 State St., Boston, plumbing for new high school and additions to present junior high school, to H. Mengoli, 340 Court St., for Town, E. H. Donovan, chn. School Comm., Town Hall***electrical work, to Millman Electric Co., 150 Court St.***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***cast stone, to Bianchi Cast Stone Co., 338 Copeland St., Quincy***marble, blackboards, tuckboards, etc., to E. Baratta Co. 51 Everett St., Brighton. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

†**Mass., Sandwich**—U. S. Coast Guard Headquarters, Wash., D. C., general contract 2 story, basement, 32x46 ft. dwelling, and 1 story, 15x17 ft. wings, and 1 story, 28x45 ft. garage, at U. S. Coast Guard Station, to J. Malaguti & Sons, Liberty St., Plymouth, $32,765. Bids Jan. 23, awarded Jan. 29. Noted Jan. 29, C. D.

†**Mass., Wakefield**—Long Constr. Co., general contractors, 185 Devonshire St., Boston, floors for U. S. Post Office, Yale Ave. and Main St., for Treas. Dpt., at office Sup. Archt., Wash., D. C., to A. N. Nobis & Co., 77 Summer St., Boston***hollow metal doors, to Aetna Steel Products Co., 136 Federal St., Boston***marble, to Vermont Marble Co., 44 School St., Boston ***painting, to H. Newton Marshall, 522 Harrison Ave., Boston***structural steel, to New England Structural Steel Co., 310 2nd St., Everett***cork carpet, to H. F. Higgins Co., 184 Summer St., Boston***granite, to H. E. Fletcher Co., West Chelmsford***vault doors, to Herring Hall Marvin Safe Co., 80 Sudbury St., Boston***roofing, to Eagle Cornice & Skylight Wks., 197 Sidney St., Boston***tile, to Artile Co., 198 North Beacon St., Brighton*** terrazzo, to De Paoli Mosaic Co., 126 Magazine St., Roxbury. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Mass., Wrentham—Grande & Volpe, Inc., general contractors, 54 Eastern Ave., Malden, heating for school, Taunton St., for Town, to Power Heating & Ventilating Co., Inc., 263 Harrison Ave., Boston***plumbing, to Lappin Bros. Co., 17 Irving St., Malden***electrical work, to Balcom Bros., 29 Irving St., Malden ***painting, to C. Dale Garbutt, 59 Trevalley Rd., Revere***roofing, to Providence Cornice Co., 309 Canal St., Providence, R. I.***stone, to S. Bianchi, 5 Martin Terrace, Mattapan, Boston***structural steel, to Groisser & Shlager Iron Wks., 84 Washington St., Somerville*** iron, to Jas. A. Glass Co., 214 High St., Boston ***building finish, to Collamore Woodworking Co., 58 North Ave., Wakefield. Noted Nov. 22, C. D.—Nov. 28, E. N.-R., under "Contracts Awarded."

Mich., Charlotte—Bd. Educ., constructing addition and alterations to school, to Spence Bros., Saginaw, $176,150***plumbing and heating, to Freyn Plumbing & Heating Co., 1708 West Lafayette St., Detroit, $29,728***electrical work, to Hall Electric Co., Muskegon, $9,651. Grand total $215,529. Bids Jan. 14. **P.W.A.** Noted Jan. 29, C. D.

†**Mich., Detroit**—P. Wks. Administration Housing Div., Dpt. Interior, Wash., D. C., constructing concrete foundations for Chandler Park Housing Project, to R. C. Schultz & Son, 134 Manistique Ave., $147,946. Bids Nov. 26. Noted Dec. 2, C. D.—Oct. 24, E. N.-R.

Miss., Jackson—W. Wood, state secy., furnishing, installing passenger elevator in new capitol building, to Otis Elevator Co., 852 Carondelet St., New Orleans, $12,748. Bids Jan. 20, awarded Jan. 22.

Miss., Jackson — H. T. Newell, pres. Bd. Educ., Separate School Dist., (1) alterations and additions to George School (2) alterations to Barr School (3) annex to Galloway School (4) additions and alterations to Whitfield School (5) improvements at Enochs Junior High School (6) at New Negro Elementary School (7) addition to Smith-Robertson School (a) general contract (b) heating and plumbing (b*) heating (b**) plumbing (c) electric wiring, to J. R. Flint Constr. Co., Jackson (1a) $28,697 ***to S. S. Richard, Jackson (1b) $3,629 (5b) $10,349***to Short Electric Co., Jackson, (1c) $933***to T. B. Scott, Jackson (2a) $4,915 ***to Oden & Glenn, Hattiesburg (3a) $14,718 ***to J. R. Flint Constr. Co., Jackson (4a) $26,211***to Paine Heating & Tile Co., Jackson (4b) $3,349 (6b*) $3,910***to E. W. Cook Electric Co., Jackson (4c) $790***to Century Electric Co., Jackson (5c) $3,569*** to Davis Plumbing Co., Jackson (6b**) $2,372 ***to Joe Williams Electric Co., Jackson (6c) $455***to Currie & Corley, Raleigh (7a) $21,-874. Grand total $125,771. Bids Jan. 6 and Jan. 7. **P.W.A.**

Miss., Lexington—Bd. Supervs. Holmes Co., c/o Miss V. Reinhart, chn., constructing and remodeling present 48x67 ft., brick jail building, and constructing addition to same, general contract, to Currie & Corley, Raleigh, $20,585 ***plumbing, to Newton Sebrum, Lexington, $1,856***heating, to Fischer Heating Co., Memphis, Tenn., $1,512***electric wiring, to Joe Williams Electric Co., Jackson, $575. Grand total $24,528. **P.W.A.** Bids Jan. 6. Former contracts rescinded. Noted Dec. 18, C. D.— Dec. 26, E. N.-R., under "Contracts Awarded."

Minn., Robbinsdale—Bd. Educ., Mrs. Edith R. Daniel, clk., plumbing, heating, ventilating for school, to J. M. Kelley, 4908 Washburn Ave. S., Minneapolis, $51,197, wiring, to Universal Electric Constr. Co., 6 South 8th St., Minneapolis, $18,300. **P.W.A.** Bids Jan. 15. Noted Jan. 23, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

†**Neb., Omaha** — P. Wks. Administration, Housing Div., Wash., D. C., removing 110 buildings on site of North Side Housing Project, to American Lumber & Wrecking Co., 2501 Washington Ave., Minneapolis, Minn. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

N. H., Durham—W. H. Trumbull, general contractor, 11 Lebanon St., Hanover, cast stone for grade school, for School Dist., G. Eastman, chn., to Lamb Cement Stone Co., 150 Lincoln St., Allston, Mass., $1,300***roofing and sheet metal, to L. H. Ufford Co., Inc., 25 Pine St., Bellows Falls, Vt., $1,095***structural steel and light iron, to Hussey Mfg. Co., Railroad Ave., Berwick, Me., $3,898***millwork, to Gregg & Son, Crown St., Nashua, $4,-237. Grand total $10,520. General contractors will do metal lathing and plastering $3,255, also painting. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. H., Lincoln—D'Amore Constr. Co., general contractors, 89 State St., Boston, Mass., heating and plumbing for high school, for Town, C. V. Doherty, chn. Building Comm., Town Hall, to Whitefield Plumbing & Heating Co., Whitefield***electrical work, to C. C. Towers, West Thornton***iron and steel, to Lyons Iron Wks., Inc., 500 Willow St., Manchester***roofing, to Jas. A. Smith Roofing Co., 127 South Main St., Manchester***millwork, to Lisbon Mfg. Co., Lisbon. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. H., Rollinsford—A. A. Littlefield & Son, general contractors, 46 East Concord St., Dover, heating and plumbing for school, for Town, E. F. Tozier, chn. School Bd., Savings Bank Bldg., to James F. McCoole, 59 Court St., Dover***electrical work, to J. P. Keenan, 352 Central Ave., Dover. Noted Jan. 24, C. D.— Jan. 30, E. N.-R., under "Contrats Awarded."

Neb., Omaha—Bd. Educ., electrical wiring for Mason School addition, to E. V. Bennett Co., Redrick Tower, $1,431***plumbing, heating and ventilating, to J. J. Hanighan Co., 617 South 14th St., $12,010***electrical wiring for Monroe School, to H. V. Miller Electric Co., 224 Insurance Bldg., $2,789. Grand total $15,-230. **P.W.A.** Bids Dec. 7. Noted Jan. 17, C. D.

N. Y., Avon—Union Free School Dist. 1, grading, excavation and foundations for school, to Swartout & Rowley, 548 Mount Hope Ave., Rochester. Former contract rescinded. P.W.A. project. Total est. $105,000. Bids on super-

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†*Federal Government.*

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Public Buildings (Continued)

†**D. C., Wash.**—Feb. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., sprinkler system, etc., in Interior Department Building.

†**D. C., Wash.**—Feb. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing roof repairs at U. S. Post Office.

†**D. C., Wash.**—Mar. 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing connecting tunnel for Dpt. Interior Buildings.

Ill., Springfield—Feb. 13, by Bd. Educ., 206 Adams St., L. Burtle, secy., constructing Highlands School addition and repairing Central School roof. P.W.A. project. M. S. Hanes, archt. for former, and R. A. Bullard, archt. for latter schools.

†**Ind., Delphi**—Feb. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Ind., Evansville—Mar. 7, by Bd. Comrs. Vanderburg Co., constructing 2 story, basement administration building for tuberculosis hospital. $167,000. Bids Jan. 17 rejected. P.W.A. project. H. E. Boyle & Co., Inc., 405 Furniture Bldg., archts. Noted Jan. 24, C. D. —Dec. 19, E. N.-R.

Ind., Kokomo—Feb. 28, by Comrs. Howard Co., constructing 3 story, basement, stone, steel court house, incl. plumbing, heating, electrical work and elevators. $350,000. P.W.A. project. O. Cook, 622 Landen Bldg., archts. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

†**Mass., Rutland**—Feb. 11 (extended date), by Vet. Bu., Arlington Bldg., Wash., D. C., furnishing elevator and altering Building 21 at U. S. Veterans Hospital. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Mo., Fulton — Feb. 13, by State Building Comn., Bi-Partisan Advisory Bd., Jefferson City, constructing additions to main group at State Hospital 1. C. A. Haskins, ch. engr. and archt. L. R. Bowen, supervising archt. Eleemosynary Institutions. Hoerer, Baum & Froese, archts. $300,000. P.W.A. project.

N. J., Leonia—Feb. 21, by Bd. Educ., Leonia High School, constructing addition to existing school, in Bergen Co. $153,700. P.W.A. project. Noted Dec. 26, C. D.—Jan. 2, E. N.-R.

N. M., Albuquerque—New Mexico University bids about Mar. 21, heating plant, $156,000; bids about Mar. 28, for state health laboratory, $57,000; bids about May 16, student union building, $105,000; and bids about Sept. 26, library, $370,000, all on University Campus. J. G. Meem, Sante Fe, archt.

N. Y., Brooklyn—Feb. 11, by W. C. Martin, archt. and supt. school Buildings, Flatbush Ave. Extension and Concord St., plumbing, drainage, heating, ventilating, electrical work for P.S. 247, 21st Ave. from 70th to 71st Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., Brooklyn—See "Contracts Awarded."

†**N. Y., Buffalo**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator plant in court house.

N. Y., Coxackie—Feb. 11, by Commissioner correction, State Office Bldg., Albany, construction, heating, sanitary, electrical work, special work, for staff accommodations for Buildings 26, 27, 28, 29 and 30, New York State Vocational Institution.

N. Y., Dannemora—Feb. 20, by Commissioner Correction, State Office Bldg., Albany, construction, heating, ventilating, electrical work, special fixtures for cell block and administration building, Clinton Prison.

N. Y., Jamaica—Feb. 18, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing heating system for Jamaica Yard Buildings, for Independent City-Owned Rapid Transit R.R., Contr. Y-81.

N. Y., Newark—Feb. 19, by Commissioner Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary and electrical work for Newark State School.

★ **N. Y., Newburgh**—Feb. 10, by Bd. Educ., general contract heating, plumbing, electrical work for 2 story, 200x300 ft. school, Monument St. $668,250. P.W.A. project. Starrett & Van Vleck, 267 5th Ave., New York, archts. Purdy & Henderson, 45 East 17th St., New York, engrs. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

N. Y., New York—Feb. 11, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., Brooklyn, general contract P.S. 113, Barnes Ave. between 216th and 217th Sts., also for excavating, grading for Bronx Industrial High School, Tinton and Union Aves. between 161st to 163rd Sts., both Bronx Boro.

N. Y., New York—See "Contracts Awarded."

O., Sandusky—Feb. 20, by Bd. Comrs. Erie Co., constructing 3 story, basement court house additions and alterations. $150,000. Bids Dec. 13 rejected. P.W.A. project. H. C. Milliott, 814 West Washington St., archt. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Pa., West Pittston—Feb. 11, by School Dist., c/o S. H. Wilson, pres., 120 Warren St., 2 story, basement, brick, wood school, plain found., incl. gymnasium, classrooms, etc. $140,000. T. A. Foster, Brooks Bldg., Wilkes-Barre, archt.

†**Tex., Fort Worth**—Feb. 25 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing buildings, roads, etc., on U. S. Narcotic Farm. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

†**Vt., Beebe**—Mar. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing inspection station. Noted Apr. 4, C. D.—Apr. 18, E. N.-R.

†**Va., Charlottesville**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office and Court House. $162,000.

†**Va., Roanoke**—Feb. 11, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing nurses' quarters; addition to present quarters at Infirmary Building 12.

Wash., Spokane—Feb. 18, by L. V. Murrow, dir. Hys., Olympia, altering and constructing addition to District Office Building, at Spokane, Unit 2, Public Wks. Project 1242, Spokane Co. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Washington."

†**Wash., Spokane**—Feb. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., installing complete elevator plant in U. S. Post Office, known as Havermale Station.

Que., Valcartier—Dpt. Natl. Defence, L. R. LaFleche, deputy minister, Ottawa, Ont., taking bids (from selected list of bidders), constructing 4 houses (ultimately 12 houses). $200,000.

LOW BIDDERS

★ **Mo., Kansas City**—City, Jan. 30, constructing city hall, from Swenson Constr. Co., Shubert Bldg., $1,497,989. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

CONTRACTS AWARDED

Calif., Berkeley—K. E. Parker Co., general contractors, 135 South Park St., San Francisco, electrical work for school reconstruction, to Spencer Electric Co., 2059 Webster St., Oakland, for Berkeley School Dist.***painting, to A. A. Zelinsky, 3011 Steiner St., San Francisco ***structural steel, to Herrick Iron Wks., 18th and Campbell Sts., Oakland. **P.W.A.** Noted Jan. 17, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Calif., Del Rey—T. C. Irwin, general contractor, 269 North Fulton St., Fresno, electrical work for school, to F. P. Vandergriff, Selma, for Prairie School Dist.***excavating and concrete work, to H. Fosnaugh, Sanger***painting, to Eddy Paint Co., Porterville***iron and steel, to Kyle Co., Fresno. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Los Gatos—J. D. Carlson, general contractor, 1331 Sierra Ave., San Jose, electrical work for high school addition, to R. Butcher, 1020 Sherwood Ave., San Jose, for Los Gatos Union High School Dist.***sheet metal, to W. Serpa, 497 North 13th St., San Jose***iron work, to Engfer Iron Wks., P. O. Box 11, San Jose***painting, to G. Smith, Los Gatos*** reinforcing steel, to San Jose Steel Co., 1344 The Alameda, San Jose***structural steel, to Engfer Iron Wks., P. O. Box 11, San Jose. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Calif., Red Bluff—Sjoberg & Son, general constractors, 5604 East 16th St., Oakland, steel sash for high school gymnasium, to Detroit Steel Products Co., 1319 63rd St., Oakland, for Red Bluff Union High School Dist.***reinforcing steel, to Truscon Steel Co., Atlas Bldg., San Francisco***structural steel, miscellaneous and ornamental iron work, to Independent Iron Wks., 821 Pine St., Oakland***painting, to M. A. Miller, 3664 Madrone Ave., Oakland*** electrical work, to Cox Electric Co., Red Bluff. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Los Angeles—Bd. Educ., reconstructing, rehabilitating, strengthening auditorium section and annex building at Malabar St. School, 3200 Malabar St., to H. A. Nichols, 936 East Slauson Ave., $20,081***1 story, 58x229 ft. new school building at San Fernando School, to Brunzell & Jacobson, 2150 Princeton Ave., $62,790***1 story, 100x131 ft., rein.-con. school, 1015 South Lorena St., to Blystone & Van Tuyle, 136 Walnut St., Brea, $52,100***1 story, 57x191 ft. new school building, 612 West 68th St., to H. F. Miller, 1908 West 75th St., $57,515. Grand total $192,486. Bids Dec. 27, awarded Jan. 16. **P.W.A.**

†**Calif., San Diego** — Yards & Docks, Navy Dpt., Wash., D. C., constructing passenger elevator at Naval Hospital, Spec. 8100, to Otis Elevator Co., 810 18th St. N.W., $21,990. Bids Jan. 22. Noted Jan. 28, C. D.

Calif., San Francisco—Lindgren & Swinerton, general contractors, 225 Bush St., reinforcing steel for administration building, Bush and Stockton Sts., for City and San Francisco Co., to W. C. Hauck & Co., 280 San Bruno Ave.*** miscellaneous iron, to Monarch Iron Wks., 262 7th St.***sheet metal, to Guilfoy Cornice Wks., 1234 Howard St.***waterproofing, to Horn Products Co., 557 Market St.***plumbing and heating, to M. J. Reevex, 959 Natoma St.*** electrical work, to Alta Electric & Mechanical Co., 467 O'Farrell St.***painting, to Aristo Painting Co., 473 Bryant St.***concrete mix, to Golden Gate Atlas Materials Co., 16th and Harrison Sts. Noted Jan. 7, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., San Rafael—De Luca & Son, Inc., general contractors, 1745 Filbert St., San Francisco, electrical work for school, for San Rafael School Dist., to L. H. Leonardi, San Rafael*** plumbing and heating, to Scott Co., 243 Minna St., San Francisco***painting, to W. G. Thompson, 336 Church St., San Francisco***reinforcing steel, to Wetenhall Co., 17th and Wisconsin Sts., San Francisco***sheet metal, to Guilfoy Cornice Wks., 1234 Howard St., San Francisco. **P.W.A.** Noted Jan. 15, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Calif., Santa Rosa—Supervs. Sonoma Co., 2 story, steel, rein.-con. county hospital, to C. J. Walker Co., Sharon Bldg., San Francisco, $207,080. Bids Jan. 16, awarded Jan. 27. Noted Jan. 27, C. D.—Oct. 17, E. N.-R.

Calif., Sebastopol—A. Nelson, Inc., general contractors, 242 Ocean Ave., San Francisco, reinforcing steel for school, for Analy Union High School Dist., to Pacific Coast Steel Co., 20th and Illinois Sts.***miscellaneous iron, to Anchor Post Fence Co., 460 Fifth St., San Francisco***plumbing and sheet metal work, to F. Davison, 375 Monterey Blvd., San Francisco***overhead doors, to C. J. Waterhouse, Sharon Bldg., San Francisco***electrical work, to San Carlos Electric Wks., San Carlos*** painting, to A. A. Zelinsky, 3011 Steiner St., San Francisco***steel windows, to Detroit Steel Products Co., 111 Sutter St., San Francisco. **P.W.A.** Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Stockton—O. H. Chain, general contractors, 41 South Sutter St., Stockton, electrical work for warehouse, for City, Port Dist., to Collins Electric Co., 708 East Market St. ***painting, to J. F. Ecker, 17 West Poplar St.***concrete work, to A. Sandberg, R.F.D. Box 2, Stockton***sprinkler system, to Grinnell Co. of Calif., 5th and Brannan Sts., San Francisco***reinforcing steel, to F. A. Klinger, P. O. Box 757***plumbing, to Miller-Hayes Co., 742 East Weber St. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Conn., Guilford—E. and F. Constr. Co., general contractors, 94 Wells St., Bridgeport, iron for high school, to Hubbard's Tinker Shop, 23 Water St., for Town, School Bd. Noted Jan. 22, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Conn., New Britain—Bd. Educ., 3 story, basement, 147x185 ft., T-shaped annex to Roosevelt School to serve as East Side Junior High School, Goodwin St., to Michael A. Connor, 15 Standish St., Hartford, $143,859***plumbing and heating, to C. N. Flagg, Meriden, $30,950 ***electrical work, to Perry Electric Co., 442 New Britain St., Hartford, $7,784. Grand total $182,593. **P.W.A.** Bids Jan. 15, awarded Jan. 22. Noted Jan. 24, C. D.—Dec. 26, E. N.-R.

Conn., Stratford—Hans Christensen, general contractors, 100 Chalmers Ave., Bridgeport, limestone for school, North Parade St., for Town, W. H. Shea, town mgr., to Ingall Stone Co., Bedford, Ind.***steel sash, to Detroit Steel Products Co., 2250 East Grand Blvd., Detroit, Mich.***blackboards, to Hartford Cement Co., 51 Homestead Ave., Hartford***plumbing, heating, to Mitchell & Bailey, 756 Railroad Ave., Bridgeport***electrical work, to Electric Shop, 2378 Main St.***painting, to C. L. Parsons, 795 Nichols Ave., Stratford***millwork, to Frank Miller Lumber Co., 125 East Wash Ave., Bridgeport***steel joists, to Kalman Steel Co., 75 Federal St., Boston, Mass.***metal base, to Knapp Bros., Joliet, Ill.***terrazzo floors, to Doolittle Tile Co., Main St., Bridgeport***roofing, to Fanton & Roberts, 80 Pine St., Hartford. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Conn., Stamford—Municipality, Municipal Offices, municipal building. Project indefinitely in abeyance. Mayers, Murray & Phillips, 2 West 47th St., New York, archts. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

★ †**D. C., Wash.** — **Federal Reserve** Bank, Treas Dpt., Wash., D. C., constructing Georgia marble federal reserve building, Constitution Ave., to George A. Fuller Co., Munsey Bldg., $3,484,000. Bids Jan. 29. Noted Jan. 31, C. D.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., altering basement Department of Justice Building to provide restaurant in basement, to Thum Co., Inc., 412 Insurance Bldg., Wash., D. C., $11,803.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., connecting wing buildings sculptural stone carving, to Edward Ardolino, 286 5th Ave., New York, N. Y., $22,000.

†**D. C., Wash.**—Officer Quartermaster General, air conditioning in northwest wing Army Medical Center, to Raisler Heating Co., 129 Amsterdam Ave., New York, $7,450***heating and ventilating, to Norair Eng. Co., 18th St. N.W., $5,700***cubicles and their installation, to Dahlstrom Metallic Door Co., Jamestown, N. Y., $37,822. Grand total $50,972.

Ill., Elgin—Dpt. P. Wks. & Buildings, Div. Architecture, Springfield, pipe covering for heating and plumbing systems, for Infirmary Buildings 1 and 2, Elgin State Hospital, to Standard Asbestos Mfg. Co., 820 West Lake St., Chicago, $3,675 and $2,865 respectively***plumbing, incl. water serv., to F. J. Bero Co., 323 South Commonwealth Ave., Chicago, $31,480***electrical wiring, to Hoffman Electric Co., 2525 West Van Buren St., Chicago, $17,050***sterilizing equipment, to Scanlon Morris Co., Madison, Wis., $3,927. **P.W.A.** Bids Jan. 14, awarded Jan. 24. Noted Jan. 24, C. D.—Jan. 9, E. N.-R.

†**Ill., Hines**—Vet. Bu., Wash., D. C., replacing elevator door equipment, etc., at Veterans Hospital, to Otis Elevator Co., 810 18th St., Wash., D. C., $3,541.

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†*Federal Government*

Public Buildings (Continued)

Ill., **Jacksonville**—Bd. Educ., general contract 2 reinf.-con., brick school buildings, to Smirl & Gibson, 203 Hopper Bldg., $85,306***plumbing and sewering, to Carson Payson Co., 616 North Jackson St., Danville, $6,262***heating, ventilating and temperature control, to D. F. Edwards Heating Co., 2340 Pipe St., St. Louis, Mo. **P.W.A.** Bids Dec. 23. Noted Dec. 12, C. D.

Ill., **Rock Island**—Illinois Armory Bd., Springfield, general contract armory, to Coath & Goss, 228 North LaSalle St., Chicago, $258,350*** heating and ventilating, also plumbing, to Mellvin McKay, 226 17th St., $24,870 and $14,610 respectively***wiring, to Leithner & Weishar, 1816 3rd Ave., Rock Island, $6,209. Grand total $298,429. **P.W.A.** Bids Jan. 10. Noted Dec. 12, C. D.

Ind., **Mount Vernon**—Bd. P. Wks., J. M. Bennett, clk., distribution system for municipal gas plant and distribution system, to C. I. Tenny Engr. Co., 316 Frontenac Bldg., Minneapolis, Minn., $17,136***gas generating equipment, to J. Trockman & Son, Inc., 310 Lincoln Ave., Evansville, $15,895***meters, to American Meter Co., 122 South Michigan Ave., Chicago, Ill., $2,320. Grand total $35,352. **P.W.A.** Bids Jan. 24. Noted Jan. 16, C. D.—Nov. 21, E. N.-R.

★ **Md., Baltimore**—Bd. Awards, 3 story, basement new Eastern High School, Venable Park, to M. A. Long Co., 10 West Chase St., $1,342,000. **P.W.A.** Bids Jan. 15, awarded Jan. 29. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

†**Md., Glenn Dale**—District Comrs., District Bldg., Wash., D. C., constructing Building C, nurses' home, Tuberculosis Sanatoriam, near here, to Northeastern Constr. Co., 6 West Madison St., Baltimore, $161,161. Bids Jan. 3. Noted Jan. 9, C. D.

Mass., Boston—R. J. Connolly, Inc., general contractors, 1146 Dorchester Ave., Dorchester, heating for public welfare building, Hancock St., to J. W. Praught & Co., 1049 Dorchester Ave., Dorchester, for City of Boston, Overseers of Public Welfare, 43 Hawkins St., Boston. Noted Jan. 17, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Mass., Fitchburg—Turner Constr. Co., general contractors, 143 Newbury St., Boston, heating for Senior High School, Academy St., for Bd. Educ., to V. J. Kenneally Co., 251 Causeway St., Boston***plumbing, to C. H. Cronin, Inc., 14 Byron St., Boston***electrical work, to Hixon Electric Co., 22 Elkins St., South Boston ***structural steel, to N. E. Structural Co., 310 Second St., Everett***reinforcing steel, to Concrete Steel Co., 294 Washington St., Boston*** granite, to Rollstone Granite Co., Rollstone Hill, Fitchburg***paint, to H. Newton Marshall Co., 522 Harrison Ave., Boston***glazed terra cotta, to National Fireproofing Corp., 142 Berkeley St., Boston***water struck brick, to N. E. Brick Co., 22 Beacon St., Boston***excavation work, to Chas. A. Wright, 8 Scott St., Springfield***cement, to W. E. Aubuchon Co., 73 Fairmount St.***sand and gravel, to P. J. Keating Co., 107 Kimball St. Noted Jan. 20, C. D. —Jan. 23, E. N.-R., under "Contracts Awarded."

Mass., Plymouth—D'Amore Constr. Co., general contractors, 89 State St., Boston, plumbing for new high school and additions to present junior high school, to H. Mengoli, 340 Court St., for Town, E. H. Donovan, chn. School Comn., Town Hall***electrical work, to Millman Electric Co., 150 Court St.***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***cast stone, to Bianchi Cast Stone Co., 338 Copeland St., Quincy***marble, blackboards, tuckboards, etc., to E. Baratta Co., 51 Everett St., Brighton. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

†**Mass., Sandwich**—U. S. Coast Guard Headquarters, Wash., D. C., general contract 2 story, basement, 32x46 ft. dwelling, and 1 story, 15x17 ft. wings, and 1 story, 28x45 ft. garage, at U. S. Coast Guard Station, to J. Malaguti & Sons, Liberty St., Plymouth, $32,765. Bids Jan. 23, awarded Jan. 29. Noted Jan. 29, C. D.

†**Mass., Wakefield**—Long Constr. Co., general contractors, 185 Devonshire St., Boston, floors for U. S. Post Office, Yale Ave. and Main St., for Treas. Dpt., at office Sup. Archt., Wash., D. C., to A. N. Nobis & Co., 77 Summer St., Boston***hollow metal doors, to Aetna Steel Products Co., 136 Federal St., Boston***marble, to Vermont Marble Co., 44 School St., Boston ***painting, to H. Newton Marshall, 522 Harrison Ave., Boston***structural steel, to New England Structural Steel Co., 310 2nd St., Everett***cork carpet, to H. F. Higgins Co., 184 Summer St., Boston***granite, to H. E. Fletcher Co., West Chelmsford***vault doors, to Herring Hall Marvin Safe Co., 80 Sudbury St., Boston***roofing, to Eagle Cornice & Skylight Wks., 197 Sidney St., Boston***tile, to Artile Co., 198 North Beacon St., Brighton*** terrazzo, to De Paoli Mosaic Co., 126 Magazine St., Roxbury. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Mass., Wrentham—Grande & Volpe, Inc., general contractors, 54 Eastern Ave., Malden, heating for school, Taunton St., for Town, to Power Heating & Ventilating Co., Inc., 263 Harrison Ave., Boston***plumbing, to Lappin Bros. Co., 17 Irving St., Malden***electrical work, to Balcom Bros., 29 Irving St., Malden ***painting, to C. Dale Garbutt, 59 Trevalley Rd., Revere***roofing, to Providence Cornice Co., 309 Canal St., Providence, R. I.***stone, to S. Bianchi, 5 Martin Terrace, Mattapan, Boston***structural steel, to Groisser & Shlager Iron Wks., 84 Washington St., Somerville*** iron, to Jas. A. Glass Co., 214 High St., Boston ***building finish, to Collamore Woodworking Co., 58 North Ave., Wakefield. Noted Nov. 22, C. D.—Nov. 28, E. N.-R., under "Contracts Awarded."

Mich., Charlotte—Bd. Educ., constructing addition and alterations to school, to Spence Bros., Saginad, $176,150***plumbing and heating, to Freyn Plumbing & Heating Co., 1708 West Lafayette St., Detroit, $29,728***electrical work, to Hall Electric Co., Muskegon, $9,651. Grand total $215,529. Bids Jan. 14. **P.W.A.** Noted Jan. 29, C. D.

†**Mich., Detroit**—P. Wks. Administration, Housing Div., Dpt. Interior, Wash., D. C., constructing concrete foundations for Chandler Park Housing Project, to R. C. Schultz & Son, 134 Manistique Ave., $147,946. Bids Nov. 26. Noted Dec. 2, C. D.—Oct. 24, E. N.-R.

Miss., Jackson—W. Wood, state secy., furnishing, installing passenger elevator in new capitol building, to Otis Elevator Co., 852 Carondelet St., New Orleans, $12,748. Bids Jan. 20, awarded Jan. 22.

Miss., Jackson — H. T. Newell, pres. Bd. Educ., Separate School Dist., (1) alterations and additions to George School (2) alterations to Barr School (3) annex to Galloway School (4) additions and alterations to Whitfield School (5) improvements at Enochs Junior High School (6) at New Negro Elementary School (7) addition to Smith-Robertson School (a) general contract (b) heating and plumbing (b*) heating (b**) plumbing (c) electric wiring, to J. R. Flint Constr. Co., Jackson (1a) $28,697 ***to S. S. Richard, Jackson (1b) $3,629 (5b) $10,349***to Short Electric Co., Jackson, (1c) $933***to T. B. Scott, Jackson (2a) $4,915 ***to Oden & Glenn, Hattiesburg (3a) $14,718 ***to J. R. Flint Constr. Co., Jackson (4a) $26,211***to Paine Heating & Tile Co., Jackson (4b) $3,349 (6b*) $3,910***to E. W. Cook Electric Co., Jackson (4c) $790***to Century Electric Co., Jackson (5c) $3,569*** to Davis Plumbing Co., Jackson (6b**) $2,372 ***to Joe Williams Electric Co., Jackson (6c) $455***to Currie & Corley, Raleigh (7a) $21,-874. Grand total $125,771. Bids Jan. 6 and Jan. 7. **P.W.A.**

Miss., Lexington—Bd. Supervs. Holmes Co., c/o Miss V. Reinhart, chn., constructing and remodeling present 48x67 ft., brick jail building, and constructing addition to same, general contract, to Currie & Corley, Raleigh, $20,585 ***plumbing, to Newton Sebrum, Lexington, $1,856***heating, to Fischer Heating Co., Memphis, Tenn., $1,512***electric wiring, to Joe Williams Electric Co., Jackson, $575. Grand total $24,528. **P.W.A.** Bids Jan. 6. Former contracts rescinded. Noted Dec. 18, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Minn., Robbinsdale—Bd. Educ., Mrs. Edith R. Daniel, clk., plumbing, heating, ventilating for school, to J. M. Kelley, 4908 Washburn Ave. S., Minneapolis, $51,197; wiring, to Universal Electric Constr. Co., 6 South 8th St., Minneapolis, $18,300. **P.W.A.** Bids Jan. 15. Noted Jan. 23, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

†**Neb., Omaha** — P. Wks. Administration, Housing Div., Wash., D. C., removing 110 buildings on site of North Side Housing Project, to American Lumber & Wrecking Co., 2501 Washington Ave., Minneapolis, Minn. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

N. H., Durham—W. H. Trumbull, general contractor, 11 Lebanon St., Hanover, cast stone for grade school, for School Dist., G. Eastman, chn., to Lamb Cement Stone Co., 150 Lincoln St., Allston, Mass., $1,300***roofing and sheet metal, to L. H. Ufford Co., Inc., 25 Pine St., Bellows Falls, Vt., $1,095***structural steel and light iron, to Hussey Mfg. Co., Railroad Ave., Berwick, Me., $3,898***millwork, to Gregg & Son, Crown St., Nashua, $4,-237. Grand total $10,520. General contractors will do metal, lathing and plastering $3,255, also painting. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. H., Lincoln—D'Amore Constr. Co., general contractors, 89 State St., Boston, Mass., heating and plumbing for high school, for Town, C. V. Doherty, chn. Building Comn., Town Hall, to Whitefield Plumbing & Heating Co., Whitefield***electrical work, to C. C. Towers, West Thornton***iron and steel, to Lyons Iron Wks., Inc., 500 Willow St., Manchester***roofing, to Jas. A. Smith Roofing Co., 127 South Main St., Manchester***millwork, to Lisbon Mfg. Co., Lisbon. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. H., Rollinsford—A. A. Littlefield & Son, general contractors, 46 East Concord St., Dover, heating and plumbing for school, for Town, E. F. Tozier, chn. School Bd., Savings Bank Bldg., to James F. McCoole, 59 Court St., Dover***electrical work, to J. P. Keenan, 352 Central Ave., Dover. Noted Jan. 24, C. D.— Jan. 30, E. N.-R., under "Contrats Awarded."

Neb., Omaha—Bd. Educ., electrical wiring for Mason School addition, to E. V. Bennett Co., Redrick Tower, $1,431***plumbing, heating and ventilating, to J. J. Hanighan Co., 617 South 14th St., $12,910***electrical wiring for Monroe School, to H. V. Miller Electric Co., 224 Insurance Bldg., $2,789. Grand total $15,-230. **P.W.A.** Bids Dec. 7. Noted Jan. 17, C. D.

N. Y., Avon—Union Free School Dist. 1, grading, excavation and foundations for school, to Swartout & Rowley, 548 Mount Hope Ave., Rochester. Former contract rescinded. P.W.A. project. Total est. $105,000. Bids on super-

†Federal Government.

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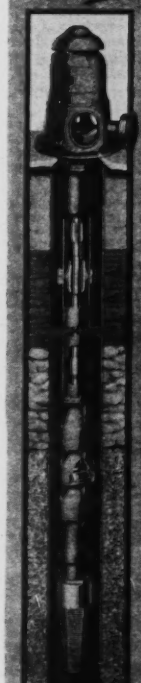

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Public Buildings (Continued)

structure later. Noted Dec. 2. C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

N. Y., Brooklyn—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing club house, Dyker Beach Park, 7th Ave. and 86th St., by W.P.A. labor. $250,000. A. Embury, 2nd, c/o owner, archt. Owner will purchase materials.

N. Y., Brooklyn—Lundin-Halwer Corp., general contractors, 103 East 125th St., New York, 360 tons structural steel for School 207, for Bd. Educ., 500 Park Ave., to Harris Structural Steel Co., 419 4th Ave., New York. Noted Jan. 22. C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. Y., Fleischmanns — J. T. Kane, general contractor, 25 Parsons St., Binghamton, reinforcing steel and steel joists for school, to Concrete Eng. Co., 75 West St., New York, for Bd. Educ. **P.W.A.** Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., New York—Dpt. Plant & Structures, Municipal Bldg., altering ferry building into municipal lodgings, South Street Ferry, day labor and separate contracts, $200,000. Dpt. Public Welfare, Municipal Bldg., lessee. A. F. Stokes, c/o owner, archt. Noted Jan. 6, C. D. —Jan. 9, E. N.-R.

†**N. Y., Rochester**—H. Stallman Sons Co., general contractors, 135 Spring St., reinforcing steel for U. S. Post Office, Central Ave., for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Kalman Steel Co., Bethlehem, Pa.***ornamental iron, to Guarantee Iron Wks., 16 Railroad St., Rochester***plumbing, to Howe & Bassett, 840 University Ave.***heating, to Lothar G. Groessus, 332 Hurstbourne Rd., Rochester***electrical work, to Laube Electric Corp., 191 East Ave.***cut stone, to Ohio Cut Stone Co., Builders Exchange Bldg., Cleveland, O. **P.W.A.** Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., Rochester—A. Friederich & Sons Co., general contractors, 710 Lake Ave., painting for West High School, 501 Genesee St., for Bd. Educ., to Seebach Kimble Inc., 336 St. Paul St.***roofing, to Smith-Murray, Inc., 999 East Main St.***tile and marble, to Nell Bros. & Kern, 151 Mount Hope Ave. **P.W.A.** Bids Nov. 26. Noted Dec. 2. C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

N. Y., Snyder—Bd. Educ., Eggertsville, general contract school, Main St., to C. H. Everitt, Inc., 295 Auburn Ave., Buffalo***plumbing, to W. Dechert, 31 River St., Buffalo***heating, to F. Cook & Sons, 102 Deerhurst Park Blvd., Kenmore***electrical work, to Ferguson Electric Co., 204 Oak St., Buffalo. Total est. $278,408. **P.W.A.** Bids Jan. 16. Noted Jan. 21, C. D.—Jan. 9, E. N.-R.

N. C., Raleigh—Div. Purchase and Contr., A. S. Brower, dir., barred cell fronts, gratings, locking device, etc., to Stewart Iron Wks. Co., 17th St. and Madison Ave., Covington, Cincinnati, O., $42,500. Noted Jan. 24, C. D.

†**N. C., Reidsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., installing 1 freight elevator in U. S. Post Office, to Westbrook Elevator Mfg. Co., 410 Spring St., Danville, Va., $3,336. Bids Jan. 17. Noted Jan. 21, C. D.

O., Dover—City, electric generating station, Contr. 11, underfeed stokers, to Westinghouse Electric & Mfg. Co., East Pittsburgh Wks., East Pittsburgh, Pa., $14,385; Contr. 10, water tube boiler and auxiliaries, to Erie City Iron Wks., 1524 Raspberry St., Erie, Pa. $29,564. **P.W.A.** Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

O., Liberty Center — Village, plumbing and heating for school, to S. A. Esswein Heating & Plumbing Co., 546 West Broad St., Columbus, $11,332. **P.W.A.** Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

O., Massillon — City, constructing libraries, plumbing and heating, also vacuum cleaning system, to Standard Plumbing & Heating Co., 435 Walnut Ave., S. E., Canton, $15,455 and $1,585 respectively. **P.W.A.** Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

★ **Pa., Phila.**—Bd. Public Educ., Administration Bldg., constructing Junior High School, 24th and Masters Sts., and vocational school, 22nd St. and Lehigh Ave., to McNichol Paving & Constr. Co., 1923 Cherry St., $1,197,000 and $280,000 respectively; elementary school, 18th and Oxford Sts., to McCloskey & Co., 1620 West Thompson St., $460,678. Grand total $1,937,678.

†**Pa., Pittsburgh**—Treas. Dpt. at office Sup. Archt., Wash., D. C., miscellaneous changes in U. S. Post Office and Court House, to Centaur Constr. Co., 11 West 42nd St., New York, N. Y., $47,137. Bids Jan. 3. Noted Jan. 9, C. D.—Dec. 19, E. N.-R.

Pa., Pittsburgh—Mellon Stuart Co., general contractors, Oliver Bldg., 425 tons structural steel for Washington Trade School and 205 tons for Burgwin Trade School, for Bd. Educ., to Keystone Eng. Co., Maloney Bldg. Noted Jan. 23. C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, heating for employees' dormitory at Mental Hospital, to J. F. Martin Plumbing & Heating Co., 236 East Ave., Pawtucket, $16,481***plumbing, to H. L. Graham & Son, 146 High St., Pawtucket, $18,632. **P.W.A.** Bids Dec. 7, awarded Jan. 24. Noted Jan. 16, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract altering 2 story, basement chapel from dormitory at Mental Hospital, to Pawtucket Cabinet & Builders Finish Co., 18 Spencer St., Pawtucket, $57,649***heating and plumbing, to W. D. Fortin, Inc., 888 Main St., Pawtucket, $4,500 and $2,500 respectively*** electrical work, to Brady Electric Co., Inc., 49 Westminster St., Providence, or 236 Bedford St., Fall River, Mass., $3,500. Grand total $68,149. Bids Dec. 18, awarded Jan. 25. Noted Jan. 3, C. D.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract 2 story, basement, medical staff building at Mental Hospital, to P. Martelli & Sons, 404 High St., Bristol, $45,410***heating, to Taylor Heating Co., 714 Broad St., Providence, $4,190***plumbing, to J. P. Cuddigan, 938 Broadway, East Providence, $3,843***electrical work, to Cohen Co., 233 Richmond St., Providence, $2,190. Grand total $55,633. **P.W.A.** Bids Jan. 25, awarded Jan. 29. Noted Jan 24. C. D.—Jan. 30, E. N.-R.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, 1 story dairy barn at State Hospital, to Dimeo Constr. Co., 75 Westminster St., Providence, $72,000*** addition and alterations to infirmary chapel at State Hospital, to Coleman Constr. Co., Inc., 86 Weybosset St., Providence, $35,225. **P.W.A.** Bids Dec. 6 and Dec. 30, respectively, awarded Jan. 23 and 24 respectively. Noted Dec. 16, C. D.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract 3 story, basement, psychiatric clinic, at State Hospital, to O. Ahlborg & Sons, 97 Friendly Rd., Cranston, $217,200***heating, to J. F. Martin Plumbing & Heating Co., Inc., 236 East Ave., Pawtucket, $17,987***plumbing, to H. L. Graham & Son, 146 High St., Pawtucket, $23,447***electrical work, to Cohen Co., 233 Richmond St., Providence, $8,000***general contract 2 story, basement, employees' quarters at State Infirmary, to Carey Constr. Co., 56 North Main St., Fall River, Mass., $125,962 ***heating, to Files Engr. Co., 30 Bourn St., Providence, $7,997***plumbing, to Jos. P. Cuddigan, 938 Broadway, East Providence, $9,542 ***electrical work, to Stanford Electric Constr. Co., 4 Westminster St., Providence, $5,262. Grand total $415,397. **P.W.A.** Bids Jan. 23, awarded Jan. 29. Noted Jan. 16, C. D.

R. I., Providence—City, Bd. Contr. & Supply, City Hall, plumbing for Senior High School, Mt. Pleasant Ave., to Jas. S. Cassedy, Inc., 133 Austin St., Cambridge, Mass., $108,963. C. T. Wills, Inc., general contractors, 346 Washington St., 1,200 tons structural steel for same, to Bethlehem Fabricators, Inc., Bethlehem. Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

S. D., Redfield—State Bd. Educ., general contract 3 story, 70x180 ft. girls' building at State School, to S. W. Jonason & Co., Aberdeen, $138,965***plumbing and heating, to Kelley Heating & Plumbing Co., 217 South Lincoln St., Aberdeen, $19,950***wiring, to Aberdeen Electric Co., Aberdeen, $4,207. Grand total $163,122. **P.W.A.** Bids Jan. 15. Noted Jan. 8, C. D.

Tenn., Jackson—Foster & Creighton, general contractors, American Natl. Bank Bldg., Nashville, painting for court house and jail, for Madison Co., A. W. Ide, judge, to Haynes & Weaver, millwork, to City Lumber Co.*** linoleum, to W. P. Dabney & Sons, all foregoing in Jackson***plumbing and heating, to J. Nolie, Memphis***ornamental miscellaneous iron, to Kerrigan Ornamental Iron Wks., Inc., 223 4th Ave., Nashville***structural steel, to McCann & Nabors, Nashville. Noted Nov. 21, C. D.—Nov. 28, E. N.-R., under "Contracts Awarded."

†**Tex., Houston**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Parcel Post Building (except elevators), to U. S. Fireproofing Co., 228 North LaSalle St., Chicago, Ill., $465,800 (2) $455,800. Noted Jan. 23, C. D.—Jan. 9, E. N.-R.

†**Va., Norfolk** — Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling custom house, to W. T. Gregory, 300 Flat Iron Bldg., $65,079. Bids Dec. 16. Noted Nov. 20, C. D.—Nov. 28, E. N.-R.

Wash., Ellensburg — State Normal School, constructing auditorium-classroom, to Henrikson-Alstrom Constr. Co., Textile Tower, Seattle, $174,332. Noted Jan. 3. C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Wash., Pullman—Washington State College, plans by S. Smith, Pullman, gymnasium, swimming pool and health building for women, $400,000. P.W.A. grant $180,000. This contract had previously been awarded to Roberts & Johnson, Tacoma. Due to death of both partners firm was forced to suspend operation, and next low bidder received job.

Wis., Wauwatosa—Milwaukee Co., general contract 1 story, basement, 80x181 ft. boiler house at County Institutions, to R. L. Reisinger & Co., 733 North Van Buren St., $29,975. General contractor awarded excavation contract, to Wussow Bros., 127 West Concordia Ave.*** structural steel, to C. Hennecke Co., 3225 North Pierce St.***millwork, to A. Lentz Co., 1256 North 70th St.***plaster, to J. E. Gregory, 2448 North 73rd St.***sheet metal, to Midwest Ventilating Co., 123 East Pittsburgh Ave. ***painting, to J. Lindner, 1552 South 79th St***glazing, to Potke Bros. Inc., 226 North Water St. **P.W.A.** Bids Jan. 21.

Wis., West Milwaukee—School Dist. 12, general contract 2 story, 144x162 ft. high school addition, Greenfield St., to Siesel Constr. Co., 514 East Ogden Ave., Milwaukee, $206,377*** general contractor awarded contract for structural steel and iron, to Lakeside Bridge & Iron Co., 3200 West Villard Ave.***metal work, to Crittal Mfg. Co., 125 East Wells St.*** roofing insulation, to F. J. A. Christiansen Roofing Co., Inc., 2139 West Purdue St.***millwork, to Interior Woodwork Co., 919 West Bruce St.***plaster, to Standard Plastering Co., 4712 North 29th St.***sheet metal, to Midwest Ventilating Wks., 123 East Pittsburgh Ave.***tile, to U. F. Durner Co., Inc., 815 West St. Paul Ave.***marble and blackboards to McClymont Marble Co., 123 North 27th St. ***terrazzo, to American Mill & Mosaic Co., 1444 North Water St.***glass, to Milwaukee Plate & Window Glass Co., 508 South 2nd St. ***painting, to E. Holland, 2194 North 16th St.***resilent flooring, to Middletown Floor Co., Inc., 1012 North 3rd St.***heating and ventilating, to P. Gruman, 2697 South Kinnickinnic Ave.***plumbing, to R. Wentz, 5518 West Greenfield Ave.***electrical work, to Herman Andra Electric Co., 2110 West Clybourn St. ***terra cotta, to Northeastern Terra Cotta Co., Minneapolis, Minn. **P.W.A.** Bids Jan. 21. Noted Jan. 28, C. D.—Jan. 16, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., San Francisco—Golden State Theatre & Realty Co., 25 Taylor St., plans by M. Jorgensen, 321 Bush St., 1,500 seating capacity, Class "S" rein.-con., steel theatre, 24th and Noe Sts.

Calif., San Francisco—The Emporium, Market St. at Powell St., plans installing escalators in department store. To exceed $100,000. Private plans.

Conn., Hartford — Green Hotel Co., 366 Asylum St., making plans remodeling former Hotel Garde, incl. repairs, alterations, banquet hall and private dining halls, Asylum St. $140,000. Private plans.

Conn., New London—Connecticut College for Women, K. Blunt, pres., Mohegan Ave., plans brick, stone library addition, $150,000. Architect not appointed.

Mass., Roxbury—New England Baptist Hospital, A. H. Curtis, pres. Bd. Trustees, 85 Parker Hill Ave., plans by Kendall, Taylor Co., 142 Berkeley St., Boston, hospital addition, Parker Hill Ave. To exceed $140,000.

Mass., Natick—Bd. Trustees, Leonard Morse Hospital, Selectmen's Office, Merchants Assn. Bldg., soon lets contract 2 story, basement, brick, steel, stone hospital addition, concrete found., Union St. $146,000 or more. P.W.A. project. Stevens, Curtin & Mason, 45 Newbury St., Boston, archts. Noted Sept. 25, C. D. —Oct. 3, E. N.-R.

Mo., Kansas City—Continental Building Co., Land Bank Bldg., sketches by Hoit, Price & Barnes, 2500 Telephone Bldg., Kansas City, remodeling hotel, 11th St. and Baltimore Ave. $150,000.

Neb., Blair—Dana College, E. Nelson, pres., plans school buildings, incl. 2 administration buildings, chapel, dormitory. $150,000. Architect not appointed.

N. H., Plainfield—Kimball Union Academy, Meriden, sketches made by Wells, Hudson & Granger, Main St., Hanover, 2 story, basement, brick, steel, granite dormitory, concrete found. To exceed $140,000. **Maturity indefinite.**

N. J., Belleville—St. Peters Roman Catholic Church, John St., soon lets contract 2 story, basement, 60x176 ft. fireproof school, William St. $150,000 plus. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

N. J., Freehold — Major Duncan, Freehold Military School, plans by M. A. Wolf, 850 Broad St., Newark, new military school in Monmouth Co. $270,000.

★ **N. J., North Arlington**—Germer Bros., 212 Franklin St., Secaucas, plans two hundred 1 family english or colonial type, 6 room residences with attached garages. Est. $1,360,000. Private plans.

★ **N. J., Princeton**—Institute for Advanced Study, A. Flexner, dir., 20 Nassau St., plans group of college buildings. To exceed $1,000,000. Site being acquired.

N. J., Teaneck—Murray M. Rosenberg, 75 Varick St., New York, plans store and theater, Cedar Lane Rd. $140,000 or more. Site purchased. Architect not appointed.

★ **N. M., Albuquerque**—N. Salmon, Sante Fe, plans hotel and apartment between Locust and Oak Sts. $500,000.

N. Y., Brooklyn — Fine Homes, Inc., 153 Pierrepont St., Brooklyn, plans by Seelig & Finkelstein, 153 Pierrepont St., 1 story, brick dwellings, Avenue R near Nostrand Ave. $140,000.

N. Y., Brooklyn—Falmouth Homes, I. Greenholtz, pres., 1625 East 31st St., Brooklyn, plans by P. Freshman, 50 Court St., constructing group 2 story, frame dwellings, in vicinity of Exeter St. and Hampton Ave. $140,000.

N. Y., Brooklyn—Hartnat Realty Corp., 912 Avenue S, plans by Chester Architectural Corp., 26 Court St., constructing brick, concrete dwellings with garages, Avenue A, east of 93rd St. $140,000.

N. Y., Brooklyn—Otava Realty Corp., 605 41st St., plans by O. B. Almgren, 8605 3rd Ave., Brooklyn, group 2 story, brick dwellings, vicinity of East 32nd St. and 1800 Blk., $140,000.

N. Y., Forest Hills—G. L. C. Earle, Inc., 6 Burns St., plans by J. Unger, 39-01 Main St., Flushing, group 2 story, brick dwellings, Rye and Burns Sts. $140,000.

†*Federal Government.*

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Commercial Buildings (Continued)

N. Y., Jackson Heights — Thirty-Five-Forty 82nd Street Corp., 808 East 18th St., Brooklyn, plans by Kavy & Kavovitt, 16 Court St., Brooklyn, 6 story apartment, 82nd St. and 37th Ave. $200,000.

N. Y., Flushing—Supro Homes Inc., Nassau Blvd. and Main St., plans group dwellings on 50 lots, Nassau Blvd. and Main St. To exceed $150,000.

N. Y., Guilford — Christ Episcopal Church, Guilford, plans reconstructing church. To exceed $140,000. Architect not appointed.

N. Y., Jamaica—Jamaica Bay Land Co., 47-43 Little Neck Parkway, Little Neck, plans group dwellings on 400 lots, Brookville Blvd. to Hook Creek. To exceed $150,000. Site acquired. Architect not appointed.

N. Y., New York—Corporation, c/o D. Stern, 26 2nd Ave., plans altering heating in 6 story apartment, 26 2nd Ave. To exceed $37,000. Architect not appointed.

N. Y., New York — Two Thousand Two Hundred Sixty-Three University Avenue Corp., c/o J. M. Felson, archt., 250 West 57th St., plans 6 story apartment, 2269 University Ave. $200,000.

N. Y., New York—Algy Realty Corp., 219 East 171st St., plans by R. E. Golden, 135 West 79th St., 6 story apartment, Grant Ave. and 167th St. $230,000.

N. Y., New York—Garry Estate, 270 Bway., New York, plans by A. Weiser, 240 Madison Ave., altering heating, plumbing, elevators in 11 story office building, 1030 3rd Ave. Est. about $140,000.

N. Y., New York—Bijou Realty Corp., 264 West 35th St., M. Rosenfeld, pres., plans by A. Weiser, 240 Madison Ave., 6 story apartment, 232nd St. and Riverdale Ave. $225,000.

N. Y., New York — Dravo Realty Corp., D. Markbreiter, pres., 291 East 134th St., plans by G. G. Miller, 10 West 47th St., 6 story apartmet, 180 Bennett Ave. $200,000.

N. Y., New York—Framen Golding Corp., 1700 Harrison Ave., plans by I. L. Crausman, 322 East 149th St., 6 story, 85x95 ft. apartment, 175th St. and Weeks Ave. $150,000.

N. Y., New York—Garry Estate, 270 Bway., New York, plans by A. Weiser, 240 Madison Ave., altering, heating, etc., in apartment, 163 East 61st St. $37,000 with fixtures.

N. Y., New York—Immigrant Industrial Savings Bank, 51 Chambers St., plans by Voorhees, Gmelin & Walker, 101 Park Ave., altering heating fixtures in hotel, 122 West 49th St. $37,000.

N. Y., New York—Teakwood Realty Co., 745 5th Ave., plans by T. F. Price, 2019 Anthony Ave., 6 story apartment, 235th St. near Cambridge Ave. $140,000.

N. Y., New York—Nineteen West Thirty-First Street Corp., 19 West 31st St., or B. and J. Gerla, Inc., 17 East 42nd St., plans altering heating in 10 story hotel, 19 West 31st St. $37,000 with fixtures. Architect not appointed.

N. Y., Syracuse—Home Industries, Inc., 43 East Ave., plans by C. Storrs Barrows, 56 James St., Rochester, constructing 50 residences on Haddonfield Rd., in Orville, near here, $300,000.

N. Y., Syracuse—See "Materials and Equipment."

★**N. Y., Syracuse**—Syracuse University soon takes bids on excavation, foundations, etc., for Medical Center Building, Crouse Ave. Total est. $1,250,000. $850,000 P.W.A. funds allotted. Former grant withdrawn. Dwight James Baum, 542 5th Ave., New York, archt. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

N. Y., White Plains—Normandie Realty Corp., c/o R. L. Fox, Westminster Ridge and Central Parkway, or c/o Prince & Ripley, Depot Plaza, White Plains, plans constructing group frame and brick dwellings on 95 lots, Westminster Ridge and Central Parkway. To exceed $140,000.

★**N. Y., White Plains** — One South Bway. Corp., c/o M. Chutick, 211 East 53rd St., Brooklyn, plans by Kavy & Kavovitt, 16 Court St., Brooklyn, 6 story apartment, Main St. and South Bway. $500,000.

N. Y., Whitestone—W. Ring, 90-04 161st St., Jamaica, plans constructing group dwellings on 54 acre site, Long Island Sound. $140,000 or more. Site acquired.

O., Cleveland—May Co., N. L. Danby, vice pres., Euclid Ave., soon lets contract replacing 4 elevators with new elevators, enclosing same, bronze and glass store front for department store, Ontario St. F. Haushka, 9th and Chester Bldg., archt.

O., Cleveland—Great Lakes Exposition Co., L. Dickey, genl. mgr., 1803 Terminal Tower, plans by Warner & Mitchell, Bulkley Bldg., 3 story, steel frame, glass and stainless steel exterior horticultural building, along Lake Front. $150,000. Noted Nov. 25, C. D.—Nov. 28, E. N.-R.

O., Cleveland—Ohio Bell Telephone Co., 750 Huron Rd., G. A. Kositzky, ch. engr., plans 2 story, basement, brick, steel, concrete telephone exchange addition, 13172 Cedar Rd. $200,000. A. W. Bailey, 750 Huron Rd., company archt.

O., Columbus—R. W. Schiff, 360 Columbia Ave., plans by B. F. Pepinski, Ingalls Bldg., 4 story apartment. $450,000.

*Federal Government.

O., Toledo—Olander Realty Co., O. Smith, Toledo, plans by Butsch & Munger, Nicholas Bldg., 3 story, basement store and theater, $250,000. U. S. Govt. to finance one-half of cost.

Pa., Reading—Holy Cross Memorial Methodist Church plans church. Est. about $140,000. Architect not appointed.

R. I., Providence—J. Lisker, 58 Weybosset St., plans by D. Shapiro, 58 Weybosset St., 3 story, 84x200 ft., brick, steel apartment building, plain found., Waterman and Medway Sts. $150,000.

Va., Staunton—Warner Bros., 321 West 44th St., New York, N. Y., plans reconstructing theatre. Est. about $150,000. Architect not appointed.

Ont., Kitchener—Westmount Homes Ltd., 337 King St. W., Toronto, plans by C. B. Dolphin, 460 Blythwood Rd., constructing business block to serve new residential subdivision, Belmont St. $200,000.

Ont., Ottawa—A. Monette & M. Parizeau, archts., 60 St. James St. W., Montreal, Que., preparing plans and soon takes bids constructing Legation Building, Sussex St., for French Govt., Hon. R. Brugere, consul, 395 Laurier Ave. E. $400,000.

BIDS ASKED

Ill., Chicago—Feb. 20, by St. Gregory's Church, M. Klasen, pastor, 1634 Gregory St., constructing 3 story, 100x173 ft., brick school, plain found., Bryn Mawr and Paulina Sts. $200,000. K. M. Vitzthum & Co., 1 North LaSalle St., archt.

Ind., Bloomington—Feb. 11, by Bd. Trustees Indiana University, excavating, temporary drainage work for 3 story, basement, 35x140 ft. and 53x120 ft. medical school unit, 3rd St. and Forest Pl. $472,000. P.W.A. project. A. M. Strauss, 415 Cal-Wayne Bldg., Fort Wayne, archt. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Chappaqua—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., New York—Crenshaw Holding Corp., 123 West 64th St., bids about Mar. 1, constructing theatre and stores, University Ave. and 179th St. To exceed $150,000. B. Schlanger, 67 West 44th St., archt. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

O., Granville — Feb. 10, by Dennison University, constructing library. $200,000. W. Gehron, 101 Park Ave., New York, archt. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

CONTRACTS AWARDED

Calif., San Francisco—Meyer Constr. Co., general contractor, 735 Portola Dr., grading for 10 story, steel frame, concrete apartments, Broadway and Buchanan St., to H. Rosenberg, 307 Girard St., for L. A. Meyer, 735 Portola Dr.••• concrete, to Golden Gate Atlas Materials Co., 2625—16th St. Noted Oct. 24, C. D.—Oct. 31, E. N.-R., under "Contracts Awarded."

Ga., Atlanta—A. K. Adams & Co., general contractors, 542 Plum St., 800 tons structural steel for store, to Bethlehem Steel Co., Bethlehem, Pa., for S. H. Kress & Co., 114 Fifth Ave., New York. Noted Jan. 22, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Mo., St. Louis—Syndicate, c/o H. E. Weisels, 730 Chestnut St., general contract 3 story, basement, 60x75 ft. medical dental building, Taylor Ave. and Olive St., to MacDonald Constr. Co., 3829 West Pine Blvd. Bids Aug. 5. Noted Aug. 2, C. D.

N. Y., Brooklyn—G. Wharton, 424 Albany Ave., group frame dwellings, Avenue H and Glen Court, at 4600 Block, day labor and separate contracts. $140,000 or more. W. Sambur, c/o owner, archt.

N. Y., Chappaqua—R. M. Lederer, 285 Madison Ave., constructing group dwellings, 137 acre site, Sawmill River Parkway and Roaring Brook Rd., separate contracts. To exceed $140,000. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. Y., Hartsdale—Fox Meadows Estates, Inc., brick, steel apartment, plain found.; additional unit to Scarsdale Club Apartment group, near Hartsdale Station, to Shroder & Koppel, c/o owner. Est. $200,000. H. I. Feldman, c/o owner, archt.

N. Y., Jamaica—F. Berlenback, 114-41 174th St., St. Albans, constructing two 3 story apartments, 179th St. near 90th Ave., separate contracts now being awarded. To exceed $100,000. Allmendinger & Schlendorf, 1 Hanson Pl., Brooklyn, archts. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., New York—Gerard-153rd Street Corp., 1005 Walton Ave., 6 story, 80x181 ft., brick apartment, 153rd St. and Gerard Ave., separate contracts now being awarded. $250,000. R. E. Golden, 135 West 79th St., archt. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. Y., New York—One Hundred Fifty-Ninth Street Realty Corp., 22 West 1st St., Mount Vernon, constructing 6 story, brick apartment, 159th St. near 3rd Ave., separate contracts. $140,000. G. G. Miller, 10 West 47th St., archt. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., New York—Romax Realty Corp., 259 West 57th St., constructing 6 story apartment, 141 Seaman Ave., separate contracts now being awarded. $160,000. J. M. Felson, 250 West 57th St., archt. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., Tarrytown—Westchester County Syndicate Corp., Hartsdale Ave. E. (3rd unit), brick, steel apartment house group, plain founds., Hartsdale Ave. E., $145,000. Owner builds. H. I. Feldman, c/o owner, engr. and archt.

N. Y., Tonowanda—Viggo Hansen, Inc., 86 East Girard Ave., Kenmore, constructing group residences, Woodward Ave., own forces. To exceed $105,000. Owner will purchase material. **Maturity in spring.** Private plans.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Birmingham—PLANT—Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, plans improving plant recently acquired from Virginia Bridge Co. To exceed $40,000. **Maturity indefinite.**

Ark., Eldorado—REFINERY UNITS—Root Refining Co., Eldorado, plans refinery units, absorption plant. $80,000. Architect not appointed. **Maturity indefinite.**

Calif., Hamilton City—REFINERY—Holly Sugar Corp., Colorado Springs, Colo., plans refinery additions and equipment. $250,000 or more. Engineering Department of Owners, engrs.

Calif., Los Angeles — FACTORY — Federated Metals Corp., 2425 Hunter St., plans 80x140 ft. and 80x240 ft. factory buildings, East 26th St. and Indiana Ave. To exceed $37,500. Private plans.

Calif., Oakland — FACTORY — Owens-Illinois Pacific Glass Co., 1855 Folsom St., San Francisco, plans by Owners Engineering Dpt., at Alton, Ill., for factory, Fruitvale Ave. Work will be undertaken by company's local engr., P. D. Burtt, superv. engrs., 1855 Folsom St., San Francisco.

★**Calif., San Francisco**—PLANT—Bethlehem Shipbuilding Corp., Bethlehem, Pa., plans reconditioning ship building and steel plant, 20th St. and Illinois St. $2,000,000.

Colo., Leadville—MINING DEVELOPMENT—London Deep Mines Co., R. D. Elder, pres., Leadville, plans lode mining development, tunnels, etc. To exceed $50,000.

Conn., Bridgeport—SERVICE STATION—R. Voccola, 1320 East Main St., plans by P. F. Petrofsky, 955 Main St., 1 story, basement, 90x120 ft., brick, steel automobile service station, East Main and Barnum Sts. $40,000.

D. C., Wash. — SHOP and BUS GARAGE — Capitol Transit Co., 36th St. and M Sts., N. W., plans constructing shop and bus garage, $350,000. Private plans.

Fla., Callahan — PLANT — Everglades Hampers, Inc., c/o M. M. Starling, Belle Glade, plans veneer manufacturing plant. $37,000 with equipment.

Fla., Plant City—PACKING PLANT—Carey Citrus Products Corp. plans packing plant. $40,000 or more. Architect not appointed.

Ill., Chicago—PACKING PLANT—Armour & Co., Union Stockyards, Chicago, plans by F. A. Lindberg, engr. and archt., 7603 Paxton Ave., packing plant addition, 2617 West Madison Ave. $37,000 or more.

Ind., Anderson—PLANT—Guide Lamp Corp. plans constructing plant addition for manufacturing motor lamps, cowls, fenders and other parts for automobiles. To exceed $40,000. **Maturity indefinite.**

Ind., Charleston—PLANT—Carl Lutz Stone Co., Charlestown, plans constructing plant. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

★**Ind., Kokomo** — PLANT — Chapman Price Steel Co., subsidiary Continental Steel Corp., Kokomo, remodeling North Kokomo plant, placing new machinery. $500,000. J. E. Fredericks, Kokomo, genl. mgr.

Ind., Muncie — WAREHOUSE — Ball Bros. Glass Co. plans brick, steel warehouse, East 12th St. and Macedonia Ave. To exceed $50,000.

Mo., St. Louis—BUS TERMINAL—Sante Fe Trail System, 1801 Washington Ave., Missouri Pacific Transportation Co., 1728 Olive St. and Missouri Kansas & Oklahoma Coach Line, Inc., 500 Missouri Ave., East St. Louis, Ill., plans 2 or 3 story bus terminal, Bway. and Lucas Ave., on 95x115 ft. site. Site purchased.

N. Y., Buffalo—GARAGE—Witkop & Holmes, Ltd., 515 Washington St., soon takes bids brick, steel garage, plain found., 34-38 East Eagle St. $50,000. North & Shelgren, Crosby Bldg., archts. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Nev., Virginia City—MILL, etc.—Castle Peak Quicksilver Co. plans improving mill and mining property. $37,000 with equipment.

N. H., Concord—STORAGE, etc.—Colonial Beacon Oil Co., 30 Rockefeller Plaza, New York, soon lets contract storage and distribution plant. $37,000 or more.

N. Y., Brooklyn—BREWERY—George Ehret Brewery, Inc., A. E. Duerr, pres., plans reconditioning brewery, Evergreen and Central Aves. To exceed $100,000.

N. Y., New York — SHOP and SERVICE STATION—Socony-Vacuum Oil Co., 26 Bway., plans by C. M. Schultz, 1819 Bway., construct-

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Industrial Buildings (Continued)

ing shop and service station, Boston Post Rd. and 212th St. Est. about $37,000 with equipment.

N. Y., New York—STORAGE—Estate of E. A. Ridley, 70 Bway., plans by H. Hurwit, 1170 Bway., altering 5 story, brick storage, 63 Orchard St. $37,000.

★ **N. Y., New York**—ELECTRIC POWER PLANT—New York Edison Co., Irving Pl., plans reconditioning electric power plant, incl. 450 ft. stack, high pressure boilers, 50,000 kilowatt turbo-generator and other equipment, 1st Ave. and 40th St. $5,000,000. Private plans.

N. Y., New York—STORAGE, etc.—L. Tulcin & Son, Inc., 31 Greene St., plans 6 story, 25x100 ft. storage and manufacturing building, 115 Wooster St. To exceed $40,000.

N. Y., New York — GARAGE, etc. — Ronk Golding Co., 89 Broad St., plans by Maxwell Whitelaw, 27 Stone St., altering 7 story garage and manufacturing plant, 141 East 25th St. $37,000.

N. Y., Watertown—WAREHOUSE, etc.—P. W. Devendorf plans warehouse and storage, $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

N. C., Charlotte—MANUFACTURING PLANT—Carolina Aniline Extract Co., 1122 South Blvd., plans new modern plant, 2308 South Boulevard. $40,000.

O., Barnesville — BAKERY — McClelland-Kennard Baking Co. plans bakery. $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

O., Ceylon — POWER PLANT — Lake Erie Power & Light Co., Sandusky, plans electric power plant and distribution system extensions. To exceed $50,000.

O., Cleveland — PLANT — J. C. Virden Co., 6103 Longfellow Ave., plans by J. W. Little, Plymouth Bldg., packing plant addition. $50,000.

O., Cleveland — LUMBER MILL — Harvard Lumber Co., A. G. Shark, genl. mgr., 6000 Harvard Ave., plans 1 story, 50x150 ft., brick, tile lumber mill, 6000 Harvard Ave. $40,000. Architect not appointed.

O., Toledo—PLANT—Gulf Refining Co., 2935 Front St., plans repairing and altering absorption gasoline plant. Est. about $37,000 with equipment.

O., Trotwood — GRAIN ELEVATOR — Trotwood Farmers Exchange Co., G. Murr, Court House, Dayton, soon lets contract constructing 95 ft. and 2 story, 42x57 ft., brick, tile grain elevator. $44,000. Reliance Constr. Co., Indianapolis, Ind., engr.

Okla., Nash—GRAIN ELEVATOR—Farmers Co-operative Elevator Co., plans 60,000 bu. grain elevator. To exceed $40,000.

Pa., Curwensville — PUBLISHING PLANT — Curwensville Printing Co., R. E. Decker, proprietor, plans 1 story, printing and newspaper publishing plant to replace structure recently destroyed by fire, fire loss $50,000. **Maturity in Spring.** Also plans purchase of new machinery and equipment, incl. presses, typesetting machines, etc.

R. I. Central Falls—BAKERY—Proul's Bakery, W. Roy, mgr., 50 Hedley Ave., Pawtucket, plans by Dwight Seabury, 12 East Ave., Pawtucket, 2 story, basement, 40x60 ft., brick, bakery addition, concrete found., Hedley Ave. and Illinois St. To exceed $37,000 with equipment. **Maturity in spring.**

Tenn., Memphis—PLANT—Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala., plans improving plant, recently acquired from Virginia Bridge Co. To exceed $40,000. **Maturity indefinite.**

Tex., Brownsville — CANNING PLANT — Owner, c/o Chamber of Commerce, plans large brick, corrugated iron, rein.-con. canning plant, plain found. $60,000. Private plans.

Tex., Brownsville — COTTON COMPRESS — Brownsville Cotton Compress Co. plans 250x360 ft., brick modern cotton compress plant, plain found. $130,000. Interested dealers and manufacturers communicate with owners. Architect, c/o owner, archt.

Tex., Brownsville—OIL TERMINAL—Texas Co., Brownsville, 6 bulk station plants, incl. complete equipment for handling gas, oils, etc., in Brownsville Turning Basin, near here, day labor. $125,000. Will purchase material and equipment. Engineer, c/o Owners Engineering Branch, engr. Noted Aug. 8, C. D.—Aug. 15, E. N.-R.

Tex., Edinburg—GRAIN ELEVATOR—B. L. Miller, Brownsville, plans grain elevator for corn, oats, wheat, etc. Private plans.

Tex., Houston—PLANT—B. F. Bonner, 1st Natl. Bank Bldg., plans plant. To exceed $40,000 with equipment. Architect not appointed. **Maturity indefinite.** Globe Box Factory, 2601 Commerce Ave., lessee.

★ **Tex., Houston**—PLANT—Champion Fibre Co., Canton, N. C., plans pulp and fibre plant, on Houston Ship Channel, incl. plant $585,000; water supply system $200,000; electrolytic plant $300,000; machinery and equipment $2,000,000.

★ **Utah, Provo** — POWER PLANT — Utah Power & Light Co., Kearns Bldg., Salt Lake City, plans steam electric power plant. $1,600,000.

Wyo., Reliance—TIPPLE—Union Pacific Coal Co. E. McAuliffe, Omaha, Neb., pres., plans constructing steel tipple. $232,000.

★ **Wyo., Rock Springs**—POWER PLANT—Union Pacific Coal Co., Rock Springs, E. McAuliffe, pres., Omaha, Neb., plans constructing power plant. $500,000.

Alta., Edmonton—PLANT—Canada Packers Ltd., constructing 4 story, 175x200 ft. plant, rein.-con., brick, with steel columns. Noted Mar. 27, C. D.—Apr. 4, E. N.-R.

B. C., Port Alice—PLANT—B. C. Pulp & Paper Co. plans reconditioning plant. $300,000.

B. C., Vancouver—SERVICE STATIONS—Signal Oil Co. prepares plans constructing 8 service stations during 1936, also will require tanks and pumps. $150,000.

B. C., Victoria—PLANT—Davis Paper Box Co. Ltd. plans manufacturing plant. $50,000.

Ont., Cornwall—WAREHOUSE—Kraft-Phenix Cheese Co. Ltd., 147 St. Paul St., Montreal, Que., taking bids constructing warehouse, near here. Est. about $40,000. Perry & Luke, 1405 Bishop St., Montreal, Que., archts.

Ont., Leamington—PLANT—H. J. Heinz Co., Erie St. S., plans by Hutton & Souter, 910 Piggott Bldg., Hamilton, constructing extensions to plant. To exceed $200,000. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Ont., Oshawa—PRINTERY—Lakeside Publications Ltd. plans constructing printery, $40,000.

P. E. I., Charlottetown—MINING DEVELOPMENT—Argyle Development Corp. Ltd., plans mineral field development. $50,000.

Que., Montreal—FACTORY—British Vacuum Cleaner Eng. Co., London, England, A. M. Rodriguez, local mgr., plans constructing factory.

BIDS ASKED

Ariz., Cordes—MINING DEVELOPMENT—See "Contracts Awarded."

Calif., Oakland — MILL — See "Contracts Awarded."

N. Y., Albany—PLANT—Feb. 11, by APW Paper Co., 1273 Bway., New York, constructing Building E and altering other plant units, Bridge St. $200,000. Johnson & Wierk, Grand Central Terminal, New York, and Hotel Wellington, Albany, engrs. and archts.

N. Y., New York — BREWERY, etc. — John Eichler Brewing Co., 3582 3rd Ave., taking bids 3 story, brewery and storage addition, $150,000. Harley & Ellington, 1507 Stroh Bldg., Detroit, Mich., archt. and engrs.

O., Toledo — PLANT — See "Contracts Awarded."

O., Warren—ROLLING MILL—See "Contracts Awarded."

O., Youngstown—PIPE MILL—See "Contracts Awarded."

CONTRACTS AWARDED

Ariz., Cordes—MINING DEVELOPMENT—Sterling Gold Mining Co., J. A. Hamilton, pres., Cordes, gold mining development, day labor. Owner will purchase materials. To exceed $50,000.

Calif., Oakland—MILL—El Dorado Oil Co., 230 California St., San Francisco, 1 story, 100x300 ft. heavy mill construction and galvanized iron cocoanut and copra oil plant, Inner Harbor, segregated contract system. Est. $45,000. Steel frame, to Independent Iron Wks., 821 Pine St. Private plans.

Conn., Hartford—FACTORY—A. F. Peaslee, Inc., general contractors, 15 Lewis St., painting for brick, steel factory addition, Hawthorne St., to H. Smith, 30 Rosemont St., for Arrow Hart & Hegeman Co., 103 Hawthorne St. Noted Nov. 15, C. D.—Nov. 21, E. N.-R., under "Contracts Awarded."

Conn., Hartford—FACTORY—Allyn Wadhams Co., general contractors, 15 Lewis St., lathing for 4 story, factory, to Joseph Andreoni, 169 Grove St., Meriden, for Underwood Elliott Fisher Co., 410 Asylum St.***elevator to Westinghouse Electric Co., 10 High St., Boston, Mass.***cement, to Hartford Cement Co., 51 Homestead Ave.***millwork, to Hartford Builders Finish Co., 34 Potter St.***vault door, to Shaw-Walker Co., 326 Pearl St.***sound contract, to Acoustical Constr. Corp., P. O. Box 922***fire doors and kalamein doors, to Bidwell Hardware Co., 1293 Main St.***reg. sheet metal work, to C. G. Bostwick, 41 Francis Ave. Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Mass., Gardner — WAREHOUSE — Florence Stove Co., 205 School St., superstructure 2 story, 152x302 ft., brick, steel warehouse, to R. Columbus, 39 Sunset Rd.; structural steel, to Bethlehem Steel Co., 75 Federal St., Boston. Bids Jan. 20, awarded about Jan. 27. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Mass., Roxbury—BUS STORAGE GARAGE—Boston Elevated Railway, 31 St. James Ave., Boston, electrical work for bus storage garage, Washington St., to Balcom Bros., 29 Irving St., Malden. Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

★ **Mich., Grand Rapids**—PLANT—Fisher Body Corp., division of General Motors Corp., Grand Rapids Div., general contract new stamping plant, to J. A. Utley, 6031 Mansur St., Detroit. General contractor sublet contract for 4,200 tons structural steel, to Jones & Laughlin, 3rd Ave. and Ross St., Pittsburgh, Pa. Total est. $7,000,000. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

N. J., Irvington—FACTORY—Zylocase Co., 58 Woolsey St., 2 story, basement, 120x140 ft., brick, stone factory, 58 Woolsey St., to S. O. Hull, 6 Briarcliff Court, Maplewood. $38,000. Awarded Jan. 15.

N. Y., Brooklyn—BAKERY—Pataken Realty Corp., Kent and Park Aves., constructing bakery, Kent and Park Aves., to F. T. Ley, 578 Madison Ave., New York. Est. $65,000. G. S. Stubmer Bakery, lessee. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

N. Y., Buffalo — WAREHOUSE, etc. — Erie R.R. Co., G. S. Fanning, ch. engr., Midland Bldg., Cleveland, O., general contract constructing unloading warehouse and platform, to C. H. Everitt, 295 Auburn Ave.; roofing, to J. A. Sanders, 107 Lathrop St.

N. Y., New York—GARAGE, etc.—Stonedale Realty Co., 565 5th Ave., 2 story garage and service building, 446 West 29th St., separate contracts now being awarded. $85,000. Moore & Landsiedel, 3rd Ave. and 148th St., archts. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., Richmond Hill—DAIRY, etc.—White Constr. Co., general contractors, 95 Madison Ave., New York, 2,600 tons structural steel for milk depot and garage, to Bethlehem Steel Co., Bethlehem, Pa.***400 tons reinforcing steel, to Truscon Steel Co., 155 East 44th St., for Sheffield Farms, 524 West 57th St., New York. Noted Dec. 19, C.D.-Dec. 26, E.N.-R.

N. C., Greensboro—MILL—Greensboro Weaving Co., Greensboro, 140x160 ft. mill plant addition, to Chas. W. Angle, Inc., Greensboro.

O., Cleveland — FACTORY — Dobeckmun Co. (Cellophane Mfgrs.), T. F. Dolan, pres., 3301 Monroe Ave., 1 and 2 story, 115x120 ft. factory addition, 3301 Monroe Ave., to Bison Co., 12406 Marston Ave., $75,000. G. S. Rider Co., Marshall Bldg., archts. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

O., Cleveland—FACTORY—Iron Fireman Mfg. Co., H. H. Baxter, local mgr., 3170 West 106th St., factory addition, 3170 West 106th St., to Austin Co., 16110 Euclid Ave. To exceed $40,000. Private plans.

O., North Canton—FACTORY—Hoover Co., 3 story, basement factory addition, to Warren Hoffman Co., 3rd and Cleveland Aves., N.W., Canton, $100,000. C. E. Firestone, 1342 Cleveland Ave, N.W., Canton, archt.

O., Toledo—PLANT—Interlake Iron Co., 2401 Front St., constructing iron paving plate plant, separate contracts awarded. $100,000.

★ **O., Warren** — ROLLING MILL — Republic Steel Corp., Union Trust Bldg., Cleveland, improving cold rolling mill and steel finishing plant, incl. annealing furnaces, timing units, separate contracts. $500,000.

O., Youngstown—PIPE MILL—Republic Steel Corp., improving electric welding pipe mill and other additions, separate contracts. To exceed $40,000.

Pa., Carnegie—PLANT—Wettach Paint & Chemical Co., J. R. Stetler, secy., rehabilitation, enlarging and installing machinery and equipment for manufacturing paints and chemicals, separate contracts awarded. To exceed $37,000. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

S. C., Spartanburg—BOTTLING PLANT—Coca-Cola Bottling Co., Spartanburg, bottling plant, to Fiske-Carter Constr. Co., Spartanburg, about $60,000. J. F. Collins, Spartanburg, archt.

Tenn., Memphis — PLANT — Continental Can Co., 1 Pershing Sq., New York, and 265 West Trigg Ave., Memphis, D. C. Staler, mgr., 1 story, 100x300 ft., brick, steel addition for storage and trucking, to Austin Constr. Co., 510 North Dearborn St., Chicago, Ill. Est. $80,000. I. Fedasky, 1 Pershing Sq., New York, archt. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Tex., Texas City — OIL REFINERY — Pan-American Petroleum Co., equipment for polymerization unit, to M. W. Kellogg Co., 225 Bway., New York; storage tanks (about 6,000 tons steel included), to Chicago Bridge & Iron Wks., 165 Broadway, New York. Noted Sept. 30, C. D.—Oct. 3, E. N.-R.

Wash., Seattle—PLANT—Continental Can Co., 615 Orchard St., Seattle, and 1 Pershing Sq., New York, constructing 3 story, 120x150 ft. addition to plant, to Austin Co., Dexter Horton Bldg., $110,000. Noted Jan. 15, E. N.-R.

Wis., Palmyra—MILK PLANT—Pet Milk Co., 360 North Michigan Ave., Chicago, Ill., milk receiving plant, separate contracts awarded. Est. about $37,000 with equipment.

★ **Ont., New Toronto**—PLANT—Consolidated Can Co. Ltd. (Continental Can Co., 100 East 42nd St., New York), constructing plant, Birmingham St., to Austin Contg. Co., Rector St., New York. $500,000. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

★ **Ont., Sault Ste. Marie**—POWER HOUSE—Great Lakes Power Co., 526 Queen St., E., rock excavation for new power house, on Montreal River near here, to Lang & Ross, 620 Queen St. E. Total est. $1,000,000. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

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For official proposal advertising see Searchlight Section

†*Federal Government.*